



Preparing for the Top Jobs of the 21st Century

*Interim Report of the Governor's Commission on
Higher Education Reform, Innovation and Investment*

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INTRODUCTION AND EXECUTIVE SUMMARY

On March 26, 2010, Governor Bob McDonnell signed Executive Order Number Nine,¹ establishing the Governor's Commission on Higher Education Reform, Innovation and Investment, and charging it with setting forth "a comprehensive strategy for increased educational attainment, skills development, and lifelong learning that will equip Virginians to succeed at the highest levels of global economic competition."

Today we complete the first phase of our work by issuing this Interim Report recommending passage of landmark higher education legislation in the 2011 session of the Virginia General Assembly. We propose that the Commonwealth articulate a clear and achievable vision of national and international leadership in college degree attainment and personal income and, through legislation, put Virginia on a sustainable path of higher education innovation, investment and reform that will make that vision real.

Our Commission's work is ongoing, and while the legislation we propose will not complete the development of this strategic vision and program, it will set the course and commence it. To develop the full plan and detailed policies, there must be a positive, bipartisan spirit of executive and legislative branch cooperation, active collaboration and trust between and among the Commonwealth and its public and private institutions of higher education, and a dynamic, jobs-focused partnership in every region of Virginia that unites the efforts of the business and professional community and our colleges, universities, and community colleges.

Our Commission proposes a name for this comprehensive, forward-focused effort: "*Preparing for the Top Jobs of the 21st Century: The Virginia Higher Education Opportunity Act of 2011.*" We recommend that the "*Top Jobs*" or "TJ21" legislation embrace three core elements:

¹ A copy of Executive Order Number Nine, as revised on July 9, 2010, is Attachment A.

1. Economic Opportunity:

Recognizing the well-documented link between educational achievement and earning power, we propose a series of measures that will help foster economic growth in the Commonwealth and prepare Virginians for the best jobs and incomes in the knowledge-based economy. The most relevant indicators of our progress—as well as our competitive standing globally—are college degree attainment and personal income growth, and so it is to tangible improvement according to those key measures that our proposals are directed.

2. Reform-Based Investment:

Moving beyond the tiresome debate about reform versus investment, our proposals recognize the vital need for both. We do not propose quick fixes or a massive infusion of cash. Not only are those things unavailable in the present economy, but even if within our grasp they would not reflect the sound public policy taxpayers have a right to expect. To achieve our shared vision, Virginia must implement a program of sustained investment that will preserve and extend excellence in our higher education system while at the same time instituting reforms and innovations that will extend quality degree opportunities to more Virginians in creative, cost-effective ways.

3. Affordable Access:

Ultimately, this educational and economic endeavor must work for the students it seeks to serve and serve the Virginians who seek to work. Our proposals are thus directed toward ensuring that all deserving and committed Virginia students have access to an excellent education throughout our broad and diverse higher education system. The proposals likewise will help ensure that a college degree remains within reach for young people of limited or ordinary means and accessible to people already engaged in the workforce.

In remarks delivered at George Mason University before his election, Governor McDonnell candidly observed:

Many people my age and older worry that the next generation of Virginians may be the first not to enjoy greater economic opportunities than their parents—that the American Dream may be dimming for our children and grandchildren, and that other nations may pass us by in innovation and competitiveness.... [W]hile that may be unduly pessimistic, we certainly cannot afford to be blindly optimistic. The hard reality is this: The 21st-century economy requires increasingly high skill and knowledge levels. Too few Virginians are going to college and getting that preparation. And our present state policies are doing far too little about it.

The Governor's diagnosis appears to reflect an increasingly broad consensus for decisive action, and we applaud him and the Commonwealth's bipartisan legislative leadership—many of whom are members of the Commission or have been consulted during our deliberations—for recognizing the pressing need for change. Because of our excellent system of higher education, the Commonwealth has a solid platform from which to achieve leadership in the knowledge-based economy. It is our privilege as Commission members to assist in giving content to this commitment and fashioning policy recommendations to help achieve it.

For ease of reference, our interim recommendations are listed below in summary fashion. The body of our report then follows, with the following parts: a description of the Commission's work to date; a review of where things currently stand with respect to higher education in Virginia; a detailed discussion of our interim recommendations; and a concluding section on next steps.

SUMMARY OF RECOMMENDATIONS

(1) ECONOMIC OPPORTUNITY

(a) 100,000 More Degrees

- *Adopt the McDonnell/National Center for Higher Education Management Systems (“NCHEMS”) 100,000-degree goal for additional college degree attainment as a state policy priority.*
- *Enroll more Virginia students at the state’s public and private colleges by stabilizing base funding, rewarding enrollment growth, and establishing institution-specific Virginia-student enrollment targets.*
- *Encourage and facilitate degree completion by more Virginians with partial college credit.*
- *Establish targeted policies and incentives to promote improved retention and graduation rates throughout the Virginia higher education system.*

(b) STEM and Other High-Demand Degrees

- *Establish a set of “economic opportunity metrics” that will enable everyone in the higher education enterprise, including students and parents, to understand the economic impact and earning potential of particular degree programs at particular institutions.*
- *Establish a public-private collaborative effort that engages the business, non-profits, higher education and K-12 communities in the development and implementation of a comprehensive plan to increase science, technology, engineering, math, (“STEM”) and high demand degree attainment in Virginia.*

(c) Research and Development (“R&D”) Initiative

- *Develop a statewide strategic roadmap that catalogs all R&D assets and activities, particularly those related to federally funded research, and aligns Virginia’s economic development initiatives with additional R&D investments.*
- *Establish an emerging technologies fund as a vehicle for strengthening R&D-related programs, including recruitment of eminent faculty, acquisition of research-related equipment, intellectual property commercialization and seed-stage funding.*
- *Create a new state income tax credit to promote private investment in R&D activities.*

(2) REFORM-BASED INVESTMENT

(a) Year-Round Utilization

- *Engage each public higher education institution in the expedited development of a plan for optimal year-round utilization of its physical and instructional assets.*

(b) Technology-Enhanced Instruction

- *Provide infrastructure and incentives for institutions to participate in “Virtual Departments” that leverage instructional resources across the Virginia higher education system.*
- *Promote innovative course redesign initiatives that enhance instructional quality and reduce cost by incorporating new technologies into courses provided at Virginia colleges and universities.*
- *Enhance the availability, quality and affordability of online course offerings, especially for non-traditional students with partial college credit.*
- *Encourage expanded use of electronic textbooks and other online curriculum.*

(c) Degree Path Initiatives

- *Increase the statewide availability of dual enrollment and advanced placement options that can help reduce the time required to complete college study.*
- *Enhance incentives and aggressively promote options for obtaining a bachelor’s degree by enrolling first in a community college and then completing study at a four-year institution.*
- *Establish economic incentives for timely and expedited completion of bachelor’s degree programs.*
- *Develop a comprehensive college readiness plan that phases out reliance on developmental (remedial) programs at the college level by accomplishing necessary diagnostic and remedial action at the high school level.*

(d) Restructuring Refinements

- *Establish an effective consultative process for the development, refinement and endorsement of institutional performance plans with appropriate participation by executive, legislative, and institutional representatives.*

- *Revise performance metrics and corresponding incentives to make the incentives more robust and tailored to specific outcomes on state policy priorities, especially those related to economic impact and innovation.*
- *Form an executive-legislative-institutional working group to identify additional ways to reduce costs and enhance efficiency by increasing managerial autonomy with accountability at the institutional level.*

(e) Community College Reengineering

- *Support progress on the Virginia Community College System (“VCCS”) Reengineering Task Force’s ten major strategies for reform and innovation.*

(3) AFFORDABLE ACCESS

(a) Codified Funding Model

- *Codify in the Top Jobs legislation a funding model that supports sustained long-term effort to achieve the priority policy goals outlined in this report related to economic opportunity, reform-based investment, and affordable access.*

(b) Stable and Predictable Base Funding

- *Provide stable and predictable base funding for each institution using objective peer-based methodology that reduces the influence of ad hoc considerations, such as lobbying.*
- *Enroll more Virginia students at the state’s public and private colleges by stabilizing base funding, rewarding enrollment growth, and establishing institution-specific Virginia-student enrollment targets.*
- *As state support increases over time, reduce reliance on tuition and fees to support institutional operations and instruction.*
- *As growth revenues become available, deposit funds in a higher education reserve (“rainy day fund”) so that state investment in the Top Jobs priorities can be sustained over time and sudden surges in tuition can be avoided during future economic downturns.*

(c) Per-Student Funding

- *Restore and enhance funding of the tuition assistance grants (TAG) for students attending Virginia’s independent colleges.*

- *Make a ‘promise’ to every Virginia student that a significant increment of state funding will follow the student to the public or private (not-for-profit) Virginia college of his or her choice.*

(d) Need-Based Financial Aid

- *Provide additional need-based financial aid—including grants and low-interest loans, if feasible—to enhance college affordability for low- and middle-income students and their families.*

(e) Incentives for Economic Impact and Innovation

- *Provide performance-based incentive funding tied to key policy outcomes related to economic impact and innovation.*

THE COMMISSION’S WORK

The Commission’s charge reflects the Governor’s conviction that providing Virginians with affordable access to an excellent college education—especially in high-demand, high-impact disciplines—is vital for the Commonwealth’s economic resurgence and for personal opportunity in the 21st Century economy.

In his Inaugural Address, the Governor declared:

As we confront the worst economy in generations, the creation of new job opportunities for all our citizens is the obligation of our time, so all Virginians who seek a good job can find meaningful work and the dignity that comes with it That is why, even in these tough times, we will have the foresight to invest today in ideas and economic policies that increase economic prosperity tomorrow

Access to a quality education is the foundation of future opportunity New opportunities in science, technology, engineering, math and healthcare must be created And let us recognize now that a high school degree is no longer the finish line. We must create affordable new pathways to earning a college degree and make a commitment to confer 100,000 additional degrees over the next 15 years. We must make our community colleges national leaders in workforce development and career training.

These are the investments that will pay individual and societal dividends for many years to come.

In the Executive Order creating this Commission, Governor McDonnell elaborated on the present state of higher education and the challenge before us:

The current period of economic challenge facing our Commonwealth and Nation comes during an era of rapid technological advancement and intensifying international competition, requiring an increasingly knowledgeable workforce and engaged citizenry. There is a well-documented correlation between the degree or certificate a person gains and the income he or she earns—between a state’s educational attainment and its per capita income. Higher education is among the state programs generating the highest return in terms of job creation, economic growth, and ultimately tax revenues.

With great national universities, a higher education system distinguished by both its quality and diversity, and a vibrant knowledge-based economy, Virginia has a unique opportunity to show the way to a new era of American leadership in advanced education, ground-breaking research, and economic growth. Our country’s security, our state’s prosperity, and our citizens’ opportunity all depend on a sustained commitment to higher education excellence and access.

During the first decade of this century, Virginia’s state support for public colleges and universities was cut nearly in half on a per-student, constant-dollar basis. The result was an unprecedented cost shift to students and their families and a potential threat to quality and access. Tuition has nearly doubled in the past decade. Colleges and universities must continue to find ways to reduce operating costs and focus on the disciplines that lead to the high-paying jobs of the future. Greater efficiencies and more productivity in the state system must be found.

There is a pressing need for the Commonwealth to establish a long-term policy of reform, innovation and investment that will ensure instructional excellence, create affordable pathways to college degree attainment for many thousands more Virginians, prepare our citizens for employment in the high-income, high-demand fields of the new economy, foster socio-economically important research and development, and ensure affordable access to appropriate post-secondary education, training, and re-training for all Virginians.

In keeping with the Governor’s directive, our Commission has focused on—and continues to address—the following priorities:

- Preserving and enhancing the instructional excellence of Virginia’s leading universities and of the higher education system as a whole;
- Increasing significantly the percentage of college-age Virginians enrolling in institutions of higher education and attaining degrees;

- Attracting and preparing young people for the STEM (science, technology, engineering, and math) areas and other disciplines (e.g., healthcare and advanced manufacturing) where skill shortages now exist and/or unmet demand is anticipated;
- Forging effective public-private partnerships and regional strategies for business recruitment, workforce preparation, and university-based research;
- Making Virginia a national leader in providing higher education opportunities to military personnel and veterans;
- Crafting a sustainable higher education funding model that will systematically move Virginia toward higher levels of educational attainment and economic competitiveness over the next decade-and-a-half;
- Developing innovative ways to deliver quality instruction, cost-saving reform strategies, and affordable new pathways to degree attainment for capable Virginians regardless of income or background;
- Evaluating strategies to reduce costs through additional college placement testing and accelerated degree completion; and
- Creating effective workforce development programs through expanded use of the Virginia Community College System in coordination with the Governor's Commission on Economic Development and Job Creation.

The Commission's work is being accomplished primarily through its three standing committees, whose scopes of work and interim reports are attached to this report.² The major recommendations of these committees that bear on the Commission's legislative proposals for the 2011 session are set out in the Recommendations section below.

In the course of developing interim recommendations, the committees have held numerous meetings, received an impressive variety of presentations, and examined many relevant studies and reports. Much good work also has been accomplished through dialogue among Commission members and staff, representatives of the business and higher education communities, various think-tanks and policy experts, legislative members and staff, the Governor's Policy Office, and the Office of the Secretary of Education. The Governor himself has been actively engaged in many of these discussions and has met three times with the full Commission.

² The interim report of the Degree Attainment, Financial Aid and Workforce Training Committee is Attachment B. The interim report of the Innovation and Cost Containment Committee is Attachment C. The interim report of the Regional Strategies/Partnerships for Research and Economic Development is Attachment D.

The Commission has received crucial assistance from a number of quarters. In developing the proposed funding model, the Commission has been aided by representatives and staff of the Finance secretariat, State Council of Higher Education for Virginia (SCHEV), Department of Education, Department of Budget and Planning, Senate Finance Committee, House Appropriations Committee, institutions of higher education, Virginia Community College System, Virginia Business Higher Education Council (VBHEC) and others. SCHEV³, VBHEC⁴, VCCS, and the Center for Innovative Technology have been especially helpful in augmenting the staff resources of the Office of the Secretary of Education and the Governor's Policy Office. In addition, a wide range of other organizations, including the National Center for Higher Education Management Systems (NCHEMS), the Council of Independent Colleges in Virginia, and the Council on Virginia's Future have contributed materially to the Commission's work.

Finally, the Commission and its staff have been mindful of the work of another key panel created by the Governor, the Commission on Economic Development and Job Creation co-chaired by Lieutenant Governor Bill Bolling and Senior Economic Advisor Bob Sledd. We have closely coordinated our activities with members and staff of that commission. Its Final Report, issued on October 16, 2010, includes a number of recommendations that are also reflected in this report, especially in the economically vital area of university-based research and development activities. To take full advantage of the extensive work and findings by the Governor's Commission on Economic Development and Job Creation, our Commission has elected to defer until the second year of our work the exceedingly important task of developing detailed recommendations related to regional strategies and public-private partnerships for economic development, business recruitment and workforce training.

³ SCHEV personnel have served as staff to the Commission's committees and have assisted in preparing the committee reports. SCHEV staff members also have worked closely with the Commission in supplying pertinent background information and data that is included in this Interim Report.

⁴ VBHEC is a private, not-for-profit organization whose "Grow By Degrees" program seeks to advance higher education reform and investment measures that are generally consistent with many of the Commission's initiatives. VBHEC's chairman, W. Heywood Fralin, a member of the Commission, has made the "Grow By Degrees" team available to assist the members and staff of the Commission as needed.

WHERE THINGS NOW STAND

With 15 public four-year institutions, one public two-year college, a community college system with 40 campuses, 27 independent not-for-profit colleges, and a rich and growing array of degree-granting programs by for-profit private providers, Virginia's higher education system is among the nation's most diverse and accessible. Various colleges and universities in the Commonwealth routinely receive accolades from national organizations and publications that rank higher education institutions based on quality, value and performance. The accolades are welcome indeed, not only because they attest to an educational ideal that has been nurtured from colonial to modern times, but because they have the very practical effect of attracting new business investment, top jobs, and some of the nation's best and brightest minds to the Commonwealth.

Such accolades, however, may also produce a numbing self-satisfaction and cause Virginians to indulge the facile assumption that we will continue to enjoy the many benefits of a top-performing higher education system no matter how aggressively we reduce its public resources, how fast we drive up the cost to students, or how far other states and countries outpace us in embracing opportunities associated with new technologies and new models of service delivery. A dramatic wake-up call is needed.

Countless studies, including the recent comprehensive analysis by the Weldon Cooper Center for Public Service at the University of Virginia,⁵ have documented the direct correlation between educational attainment and economic prosperity—between an individual's academic credentials and his or her earning power in the marketplace. It is unsurprising, therefore, that the documented return on investment in higher education is significantly greater than for most, if not all, other governmental programs.

Despite the enormously positive economic impact of college and universities, two recessions during the past decade—one of which has no rival since the Great Depression—have caused the Commonwealth to retrench severely in its commitment to higher education. Per-student funding at four-year public institutions of higher education declined by 40 percent on a constant-dollar basis between 2000 and 2010, while at two-year institutions the reduction was 30 percent over the same period. Additional reductions have been adopted for the 2010-2012 biennium, and the situation will become more acute with the elimination of federal funding under the American Recovery and Reinvestment Act (commonly referred to as “federal stimulus funding”).

Recognizing the severe impact of these steep reductions, Governor McDonnell and the General Assembly declined to make additional reductions to higher education while closing the \$4 billion budget shortfall that confronted the 2010 legislative session. That action was important symbolically as well as substantively, because it heralded a turning point in the Commonwealth. In meeting with the Commission on October 12, the

⁵Rephann, T. J., Knapp, J. L., & Shobe, W.M. (2009, October). *Study of the Economic Impact of Virginia Public Higher Education*. Charlottesville, VA: University of Virginia Weldon Cooper Center for Public Service.

Governor expressed his determination to reverse the recent pattern of disinvestment in higher education as funds become available.

This shift in priorities is urgently needed. Even with the past decade's economic exigencies, the opportunity existed to maintain a commitment to higher education commensurate with its importance to the Virginia economy. Instead, higher education funding declined sharply as a percentage of total general fund spending in the Commonwealth. As Governor McDonnell has pointed out, if state support for higher education since 2000 had merely matched the growth in spending in the rest of the general fund budget—if it had only kept pace with *average* spending on all other general fund programs—then the Commonwealth currently would be spending \$300 million more annually on higher education. With total spending on higher education representing only 10 percent of the general fund budget in 2011-2012, it is apparent that even a relatively modest adjustment in priorities, if sustained over time, can have far-reaching effects.

Demographic trends plainly compounded the difficulties of the past decade. Fueled by a balloon in the number of college-age Virginians, the state's four-year colleges and universities increased enrollment by 24 percent between 2000 and 2010. In contrast to longstanding funding policies that routinely allocated *additional* state resources to institutions that enrolled more in-state students, institutions that chose to help the Commonwealth meet the surging demand for college enrollment in recent years did so against a backdrop of *declining* state support. As the economy has remained stagnant for a prolonged period, many displaced or under-employed workers have returned to school to upgrade their educational credentials, resulting in even higher demand on state institutions, especially the Commonwealth's community colleges. Today, the community college system is serving 22,000 or 13.2 percent more students than it was just two years ago.⁶

Because a college degree is often the lynchpin in gaining a good job, it is especially unfortunate that Virginia's decade-long decline in support for higher education reached its nadir during a time of severe economic stress on Virginians and their families. While the institutions of higher education absorbed a portion of the decade's state funding reductions through various cost-cutting strategies, the largest portion was passed along to students and their families in the form of tuition and fee increases. As a result, Virginia can no longer be considered a low-tuition state; we currently rank among the top ten states in tuition and fee charges for public colleges and universities. Student loan debt also has increased sharply—and with potentially dire consequences, since the prospect of easy repayment through rapid growth in income has dimmed dramatically.

Both access and affordability have suffered in this environment. Out-of-state students now pay on average 151 percent of the cost of their education at Virginia's public institutions, and the institutions rely heavily on those non-Virginia resident tuition and fee payments to hold down costs for Virginia students. While it is a positive sign that the Commonwealth's institutions continue to be a magnet for highly capable students from

⁶ *The Case for Change*. (2010). Retrieved from <http://rethink.vccs.edu/case-for-change/>.

around the country, undue reliance on out-of-state tuition as a major funding source inevitably limits access for Virginia students. Moreover, even out-of-state tuition is subject to marketplace realities, and the ability to generate increased revenue by hiking the price tag for students from outside the Commonwealth appears largely to have been exhausted.

As a result of all these factors, the six-year strategic plans of Virginia's four-year public institutions now contemplate only modest undergraduate enrollment increases—collectively in the three percent range—for the foreseeable future. In a word, the system appears to have reached, and perhaps exceeded, its limits. This has caused many knowledgeable members of the higher education and business communities to express profound alarm about the potential degradation of overall instructional quality and to urge a renewed commitment to stable and predictable state support combined with forward-looking innovation.

Severe financial challenges also confront Virginia's independent colleges and universities, which currently enroll roughly a fourth of all in-state undergraduate students in the Commonwealth. Since 1972, Virginia has provided vital financial support to the not-for-profit independent colleges through the Tuition Assistance Grant (TAG) Program. In 2007-2008, the per-student grant was approximately \$3,200, but state budget cuts have reduced the TAG awards by about 19 percent—to approximately \$2,600 per student—during a time when both the private institutions and their tuition-paying customers face unprecedented economic pressures.

Virginians seem to understand that the status quo is neither acceptable nor sustainable. According to extensive public opinion research conducted for the Virginia Business Higher Education Council, three-quarters of Virginians believe that a bachelor's or associates degree is essential for success in today's economy. Yet, currently only about 35 percent of college-age Virginians are enrolled in college, and only about 42 percent of working-age Virginians have a two- or four-year college degree. The gap between the expectations of the people of Virginia and the reality on the ground is striking.

In reality, the prognosis appears even worse. When Governor McDonnell echoed the concern of many Virginians that their children and grandchildren might not enjoy the same opportunities as their own generation and those before, he was expressing anecdotally a highly disturbing reality that also can be demonstrated statistically. The United States is one of only two countries in which the college degree attainment of the younger working-age cohort—ages 25-34—is actually *lower* than those in the group aged 45-64. The negative implications for America's competitiveness, and for individual opportunity and fulfillment, could hardly be clearer.

Perhaps the biggest threat to America's long-term economic prosperity and competitiveness lies in our failure to maintain our historic advantage in the vital STEM areas. In a follow-up to its urgent 2005 report entitled *Rising Above the Gathering Storm*, a National Academy of Sciences panel recently painted a dire picture, reporting that America's education system had made little progress in science and math instruction

while much of the world had made dramatic gains.⁷ Another panel, a bipartisan federal commission chaired by two former United States senators,⁸ reached similar findings earlier in the decade:

Second only to a weapon of mass destruction detonating in an American city, we can think of nothing more dangerous than a failure to manage properly science, technology and education for the common good over the next quarter century The harsh fact is that the U.S. need for the highest quality human capital in science, mathematics and engineering is not being met This is an ironic predicament, since America's strength has always been tied to the entrepreneurial energies of its people. America remains today the model of creativity and experimentation, and its success has inspired other nations to recognize the true sources of power and wealth in science, technology, and higher education In a knowledge-based future, only an America that remains at the cutting edge of science and technology will sustain its current world leadership.... [O]nly a well-trained and educated population can thrive economically, and from national prosperity provide the foundation for national cohesion.

The United States now ranks 29th out of 109 countries in the percentage of 24-year-olds with math and science degrees. Among the American states, Virginia is comparatively strong in STEM education, ranking 9th nationally in the percentage of degree awards in STEM disciplines from public universities. But the percentage of college degrees in STEM areas has been declining in Virginia in recent years despite expert predictions that by 2016 almost three-fourths of the fastest growing jobs in the United States will be in the STEM fields. To meet anticipated demand, according to one respected economist's presentation to the Commission,⁹ Virginia will need to prepare 100,000 additional workers with STEM degrees over the next decade.

The need to dramatically increase college degree attainment in the Commonwealth, with a focus in the critical STEM area and high-demand disciplines such as healthcare, has been noted by an impressive array of respected leaders, organizations, and study panels. The Council on Virginia's Future, chaired earlier by Governor Kaine and now by Governor McDonnell, has made college degree attainment its top priority. Two years ago, the Virginia Business Higher Education Council launched its "Grow By Degrees" campaign and coalition, with additional STEM degrees and innovative instructional strategies among its top policy priorities. Reflecting a degree of bipartisan consensus seldom seen in the Commonwealth, Governor McDonnell, both of Virginia's United

⁷ Members of the 2005 "Rising Above the Gathering Storm" Committee. (2010). *Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5*. Washington, D.C.: The National Academies Press.

⁸ United States Commission on National Security/21st Century. (2001, February). *Road Map for National Security: Imperative for Change*: Phase III Report of the United States Commission on National Security/21st Century.

⁹ Chmura, C. (2010, August). Job Demand Forecasting. Presentation to the Governor's Commission on Higher Education Reform, Innovation, and Investment, Hampton, VA.

States Senators, and all living former Governors joined as honorary leaders of the “Grow By Degrees” coalition.

An equally impressive succession of executive and legislative branch commissions and initiatives—Governor Gerald Baliles’s in 1988; Senator John Chichester’s in 1994; Governor Jim Gilmore’s in 1998; Governor Mark Warner’s in 2002 —have highlighted the central importance of the Virginia higher education system to the Commonwealth’s economic progress and quality of life. Yet, not since Governor Mills Godwin championed creation of the Virginia Community College System in the 1960s has a Virginia chief executive elevated higher education and its economic impact to top-priority status and undertaken to enact a long-term strategy and plan into law.

In Virginia, change typically is more evolutionary than revolutionary. Despite the recession-impelled funding cutbacks that have severely challenged colleges and universities in recent times, the stage has been set for a major higher education initiative in part through important reforms that have been instituted over the past two decades. Prominent among these have been the management decentralization pilot projects of the early 1990s, development of the “base budget adequacy” (BBA) funding model under the auspices of the Virginia General Assembly’s Joint Subcommittee on Funding Policies in 2000, the concept of institution-specific performance agreements first advanced by the Blue Ribbon Commission on Higher Education in 1998, the ground-breaking Restructured Higher Education Financial and Administrative Operations Act (Restructuring Act) of 2005, and the major research initiative launched by Governor Warner in 2006.

Higher education capital improvements, without which significant improvement in degree attainment would be impossible, have been made at key intervals: through general obligation bond issues in 1992 and 2002, and more recently through the 21st Century Capital Improvement Program legislation. Enacted in 2008, this innovative legislation provided the mechanism for a systematically planned and reliably funded program of capital investment in the Commonwealth, including higher education.

These state-level policy reforms have been matched by innovation and creativity at the institutional level. A key attribute of higher education in Virginia is system-wide diversity and institutional autonomy, and much of the progress achieved on Virginia’s public and private campuses in recent years is attributable to forward-thinking leadership, an unwavering commitment to quality, and a culture of entrepreneurship at the institutions. Various studies have documented the Virginia higher education system’s positive performance and degree output relative to cost. As already noted, the Commonwealth’s institutions have earned a steady stream of accolades and high rankings from independent organizations that also affirm their stand-out character in terms of value. These accomplishments are not cause for satisfaction or complacency, however. Rather, they suggest Virginia is well positioned to lead the way in managerial reforms, academic innovations, and new models of instruction that will reinforce and extend America’s position as a global higher education leader.

Some may suggest that the current economic crisis and severe pressure on public resources make this a poor time for Virginia to fashion a strategy for long-term investment, innovation and reform in higher education. But the opposite is true. Today's tough times call to mind the quote commonly attributed to the noted physicist and Nobel laureate, Sir Ernest Rutherford of New Zealand: "Gentlemen, we have run out of money. It is time to start thinking." The truth is, Virginians have been thinking about higher education and its indispensable role in society for a long time—going back to the days of Jefferson, and before. The essential task in these challenging times is to think seriously about how to do it better: how to deliver instruction more economically and effectively; how to leverage resources for optimal impact across the higher education system; how to foster the innovation and entrepreneurship that have long set Virginia and America apart; how to realize our colleges' full potential in the economically vital areas of research, workforce training and business recruitment; how to weave predictable and reliable funding for higher education into the fabric of state policy so that our actions match our aspirations in the years ahead.

It is certainly true that the unusually weak economy imposes limitations on near-term funding opportunities. But the lack of a full tank of gas does not make it any less important to decide on a destination; before we can head there, we have to know where we are going. If Virginia's governmental leaders in both political parties will come together to chart that course, the Commission is confident that other essential participants in this initiative—the business and professional community, the larger education community, and ultimately the people of Virginia—will respond with enthusiasm, energy and resolve.

THE COMMISSION’S INTERIM RECOMMENDATIONS

(1) Economic Opportunity

Governor McDonnell has made it “Job One” to grow the Commonwealth’s economy and create more good jobs for Virginians. So, too, has our Commission assigned the highest priority to preparing Virginians for the top jobs of the knowledge-based economy. Our economic-related recommendations are three-fold:

- To confer upon Virginians 100,000 additional college degrees from public institutions of higher education, combined with a parallel increase in privately conferred degrees, during the next fifteen years.
- To focus the increased degree attainment in high-demand, high-earning disciplines, such as STEM and healthcare.
- To promote dramatically increased public-private collaboration on university-based research and development.

We address our specific proposals in these three areas in turn.

100,000 More Degrees

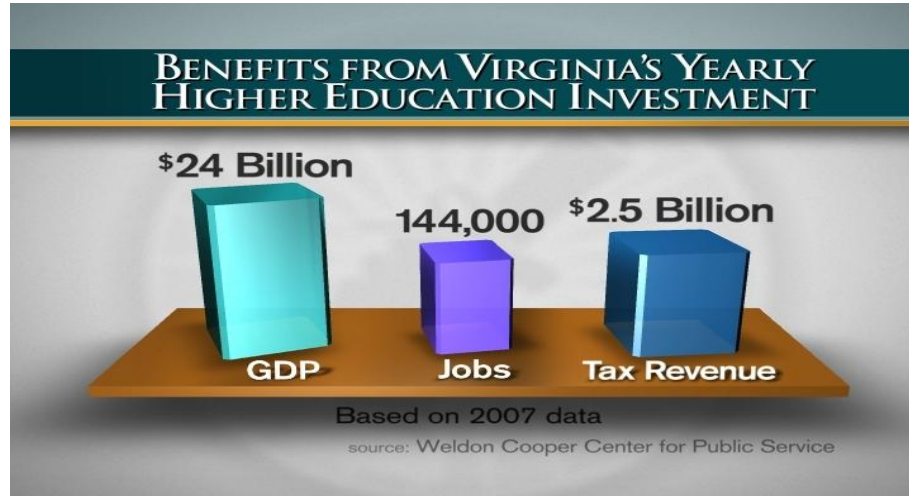
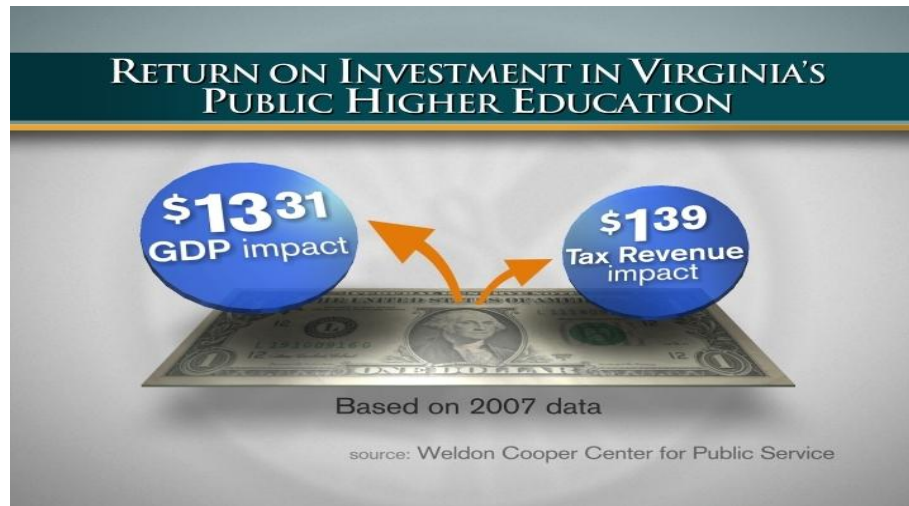
The Governor’s proposal for 100,000 cumulative additional undergraduate degrees over the next fifteen years is, first and foremost, a plan for the economic revitalization of our state and economic advancement of our fellow citizens. No other major area of expenditure by state government has a documented return on investment that approaches the return the Commonwealth realizes from its higher education system. That return is reflected in increased economic activity (Gross Domestic Product, or GDP), job creation, personal income growth, and the expanded flow of tax revenues back to state and local government coffers.

Numerous studies document the economic impact of higher education, including the recent comprehensive study of Virginia’s system by the Weldon Cooper Center for Public Service at the University of Virginia.¹⁰ The report was based on 2007 data, and results were expressed in 2007 dollars. Taking into account only the impact of the *public* institutions—and thus understating the actual return—the Cooper Center documented the following huge impact from each year’s higher education spending and degree conferral:

- For every dollar of state investment, \$13.31 is generated in increased GDP.
- For every dollar of state investment, \$1.39 is generated in increased state tax revenues.

¹⁰ The study, released in 2009, was commissioned by the Virginia Business Higher Education Council (VBHEC). Its full text is available on VBHEC’s “Grow By Degrees” website (www.GrowByDegrees.org).

- The system annually accounts for \$9.5 billion in purchases of goods and services here in Virginia and supports more than 144,000 jobs.
- Each year's investment contributes \$24 billion to the Virginia economy and produces \$2.5 billion in new state revenues.



These compelling data show that the public higher education system more than pays for itself. Of course, the benefits in terms of GDP and revenue growth are realized over time, in part through the higher earnings that college graduates receive over the course of their working lives. But since the Commonwealth is making this investment and generating the return each year, the payback on Virginians' investment is constantly cycling through. To put the impact in perspective, the \$2.5 billion in new state revenue

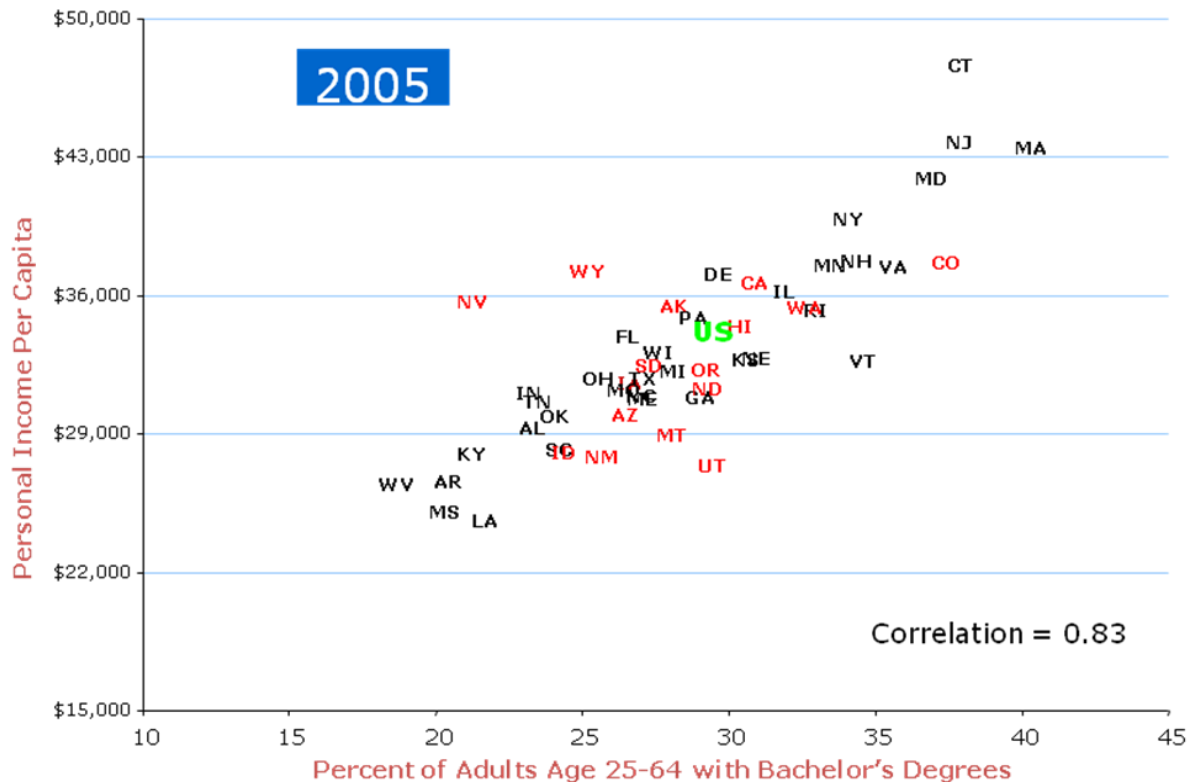
generated by each year's investment is roughly twice the combined annual state general fund appropriation for all the institutions in the system.

Another major beneficial impact from the Commonwealth's higher education investment is lower social costs. Not only do college graduates on average earn significantly higher incomes—in fact, about twice as high¹¹—than those without college degrees. They also necessitate fewer expenditures on social services, such as welfare and other forms of public assistance, healthcare payments, and corrections costs. The Cooper Center found that each year's degree production by Virginia's public higher education system is correlated with nearly \$350 million in avoided social services expenditures. Those savings go directly to the Commonwealth's—and thus state taxpayers'—bottom line.

Given the high rate of return on investment, one might be tempted to suggest that the more the Commonwealth spends on higher education, the better off it will be. The Commission makes no such sweeping assertion. Indeed, it is important to understand the analytical underpinnings of the 100,000-degree goal and the economic impact projected to result from the proposal.

When Governor McDonnell first articulated the 100,000-degree objective during the gubernatorial election campaign, he based it on an independent study commissioned by the Council on Virginia's Future and conducted by the respected National Center for Higher Education Management Systems (NCHEMS). NCHEMS assessed the additional number of undergraduate degrees it would take to place Virginia in the top rank of states and countries as measured by two key indicators of educational and economic success—college degree attainment and personal income. Based on that analysis, Governor McDonnell called for the Commonwealth's public institutions of higher education to confer 100,000 cumulative additional two- and four-year degrees on Virginia students by 2025 without any diminution in the quality of the degrees. NCHEMS presented an updated version of its analysis to the Commission at the start of our work.

¹¹ Rephann, T. J., Knapp, J. L., & Shobe, W.M. (2009, October). *Study of the Economic Impact of Virginia Public Higher Education*. Charlottesville, VA: University of Virginia Weldon Cooper Center for Public Service.



NCHEMS Chart Depicting 2005 State Performance based on Personal Income Per Capita and Percentage of Adults with Bachelor's Degrees

As the Governor noted in his charge to this Commission, the state's private colleges and other degree-conferring organizations—for-profits and not-for-profits—also have a vital role to play in increasing educational attainment. In fact, the NCHEMS assessment of the increased degree conferral required from public institutions was premised on comparable percentage growth in the degrees awarded by private institutions during the same 15-year period. When the combined number of additional publicly and privately conferred degrees is calculated, the need is for about 70,000 additional associate and bachelor's degrees over the next decade—and more than twice that number by 2025.

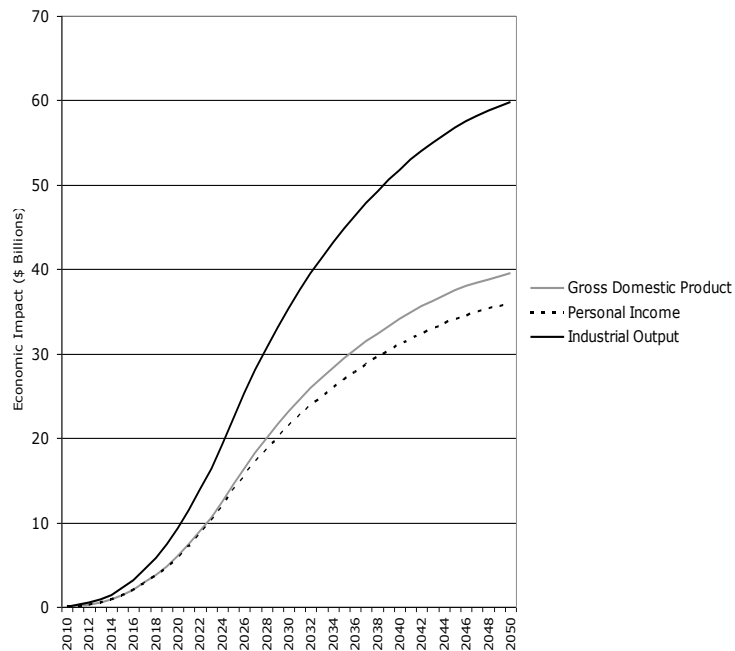
With the demographic pressures on Virginia's higher education system easing due to slower growth in the number of college-age Virginians, the increased degree conferral will have a significant positive impact on the percentage of working-age Virginians with college degrees—moving it from the present 42 percent to roughly 55 percent. A similar effort to promote increased degree attainment has been advanced by the Lumina Foundation, a respected national higher education policy organization whose self-declared "Big Goal" is to have 60 percent of the working-age population in the United

States with college degrees by 2025. Earlier this year, President Obama embraced much the same objective.¹²

The important point here is not that one can project with precision how many more college degrees are needed to reach a certain level of degree attainment in the working-age population, or that one can document the precise level at which Virginia will outperform other states and other countries educationally and economically. Those measures will always be a moving target to some extent. The important point is that Virginia's future global competitive position and the job and income opportunities that our citizens will enjoy depend on achieving significantly higher degree attainment over the next decade and beyond. The Commonwealth urgently needs to make a commitment to this core strategic objective and align its policies to begin achieving it.

We can be confident that significant economic benefits will flow from such a commitment. In its 2009 economic impact analysis, the Weldon Cooper Center documented the significant positive effects of the plan to award 100,000 more public undergraduate degrees to Virginians over the next fifteen years. Its findings understate the projected impact because the study did not take into account any corresponding growth in output from private colleges and other degree-granting entities. Nevertheless, the anticipated impact is extraordinary: \$39.5 billion in higher Virginia GDP; \$36.0 billion in increased personal income for Virginians; and \$4.1 billion in new tax revenues for state government.

¹² Remarks by President Obama on Higher Education and the Economy at the University of Texas at Austin. Washington, D.C.: The White House. Retrieved from <http://www.whitehouse.gov/the-press-office/2010/08/09/remarks-president-higher-education-and-economy-university-texas-austin>



Weldon Cooper Center Graph Depicting GDP, Personal Income and Industrial Output Impacts from Plan to Add 100,000 Degrees by 2025

The Commission has devoted significant time and attention to developing the strategies and corresponding policies that will position the Commonwealth to achieve the 100,000-degree goal. While our work is continuing, our focus has narrowed to three primary strategies.

- First, we need to enroll more Virginia students at our public and private four-year colleges, at our community colleges, and in other degree-granting programs in the Commonwealth.
- Second, we need to encourage degree completion by those in the workforce who already have partial college credit. According to independent studies, this is a large population. 900,000 Virginians—representing 21 percent of our state’s working-age population—already have some credit toward a college degree but no diploma.¹³
- Third, we need to do a better job of retaining and graduating the young people who do enroll at our public and private institutions. Too many students enroll, spend the resources of their families and taxpayers, but fail to complete their work. That is an area that demands improvement.

Enrolling More Virginia Students. The Virginia higher education system currently includes approximately 191,174 full-time equivalent students enrolled in four-year public

¹³ The Lumina Foundation. (2010, September). *A Stronger Nation through Higher Education*. Retrieved from <http://www.luminafoundation.org/publications/>.

institutions, 123,669 enrolled in public two-year colleges, 86,630 enrolled in not-for-profit independent colleges, and about 50,000 enrolled in certificate, associate, and undergraduate degree programs in proprietary career colleges and other for-profit degree-granting institutions. As Governor McDonnell's Executive Order Number Nine states, the Commonwealth's strategy for increasing college degree attainment must "embrace the full array of Virginia's higher education assets—public and private, for-profit and not-for-profit, residential and non-residential, physical and virtual—for the purpose of ensuring that all Virginians have affordable access to appropriate post-secondary education, training, and re-training opportunities."

Enrolling more Virginia students in our public institutions will require financial incentives, and the new higher education funding model recommended in a later section of this report so reflects. With many public colleges and universities having absorbed large enrollment increases in recent years without any increase in financial support from the Commonwealth, it is unsurprising that the four-year institutions now project only very modest increases in undergraduate enrollment for the foreseeable future—collectively, only about three percent over the next five years.

To make the public four-year colleges and universities full partners in achieving the 100,000-degree goal, the state must stabilize base funding, reward enrollment growth, and work with each college and university to establish new Virginia student enrollment targets that are consistent with each institution's mission, "market," and means. Independent colleges likewise should be incentivized to enroll more Virginia students. The Virginia Tuition Assistance Grant (TAG) program serves this purpose, and its funding levels should be restored as state revenues permit.

As a means of encouraging enrollment growth, the Commission recommends that the Commonwealth make a specific financial commitment to every Virginia student whose ability and effort enable him or her to meet college entrance criteria in Virginia. Under this "Virginia Promise," a constant increment of state funding—to be set initially at the current TAG funding level—would follow each student to the public or private (not-for-profit) four-year institution of his or her choosing. The payment would be made to the institution and not the student, and it would neither augment nor supplant other forms of student financial assistance. It would be funded initially from the public institutions' existing base funding (or from existing TAG payments, in the case of private colleges), resulting in no net new resources to the institutions. Over time, however, this "Virginia Promise" could have an important positive effect. It would allow student choices and demand to drive institutional funding levels, at least on an incremental and interim basis, and thus provide an incentive for institutions to enroll more students. The fact that it embodies a commitment to every Virginia student would increase the likelihood that its future funding survives the vagaries of the business cycle and political winds, thereby helping to keep the Commonwealth on track toward its long-term educational attainment goal.

Virginia's community colleges, which have experienced especially large enrollment increases in recent years, currently project substantially more robust enrollment and

degrees conferred growth than do the public four-year institutions. While these plans are still in development and it is unclear whether the underlying policy and funding assumptions will materialize, there is no doubt that an expanding community college system—with increases in both two-year degree conferral and transfers to four-year institutions—is an essential component of the state’s increased degree attainment strategy. Because the community colleges already provide a more affordable alternative, the “Virginia Promise” commitment for students attending community colleges should be somewhat less than for those attending four-year institutions.

Any consideration of enrollment growth strategies must take into account the important role that community colleges play in producing the bachelor’s degrees that are awarded by Virginia’s four-year colleges and universities. In 2008, more than a third (36 percent) of Virginia’s public and private bachelor’s degree recipients had some experience in the community college system, and more than a fourth (27 percent) previously had earned an associate degree. Actions taken pursuant to the 2005 Restructuring Act continue to facilitate transfers from community colleges to four-year institutions whether or not the student first obtains an associate degree. As we discuss more fully later in this report, promoting community college transfer options, and making sure there is room for the transferees at four-year institutions, are essential strategies for providing affordable access to college degrees for an increasing percentage of college-age Virginians.

Finally, the Commission anticipates that enrollment in career colleges and other for-profit degree-granting programs in the Commonwealth will continue to increase. In 2008-2009, nearly 12,000 certificates and associate degrees and more than 2,436 bachelor’s degrees were awarded by these institutions in Virginia. A recent report by Chmura Economics & Analytics found that career colleges were growing at an annual rate of nine percent, significantly higher than growth rates at most public and not-for-profit independent institutions.

The Commission believes the approach outlined herein will result in increased admission of Virginia students throughout the Virginia higher education system, including at the public institutions for which demand is highest throughout the Commonwealth. Preliminary anecdotal information suggests that these enrollment increases would equal or exceed the expanded enrollment of Virginia students envisioned in recent legislative proposals that would mandate higher in-state student ratios. The goal of such proposals is, or should be, to increase the admission of deserving Virginia students at our state colleges and universities. This salutary objective should be accomplished without impinging on the governing boards’ appropriate authority over out-of-state student admissions, especially given the large subsidy that tuition paid by out-of-state students provides for college-going young people from across the Commonwealth.

Degree Completion by Virginians with Partial Credit. From the Commission’s first meeting, it has been apparent that the existence of 900,000 Virginians in the workforce with some post-secondary credit but no diploma represents “low-hanging fruit” in the push to add 100,000 degrees by 2025. Efforts to promote adult education and strategies for serving more non-traditional students should not be, and are not, limited to those

Virginians with partial college credit. But the sheer number of people with some credit toward college suggests that a focused initiative there could yield strong returns for the Commonwealth and significantly improve the earnings opportunities of many Virginians.

A pressing need is to break down this 900,000-person cohort and determine how many who so identify themselves are reasonably close to the number of credits needed for a degree and have acquired those credits relatively recently. Various activities are underway in this area and should be strongly supported by the Commonwealth:

- Through the “Win-Win Project,” the Lumina Foundation will provide \$100,000 over three years to assist six community colleges—Germanna, New River, Northern Virginia, Thomas Nelson, Tidewater, and Virginia Western—in identifying “near-completers” and assisting them in obtaining an associate degree. This project can serve as a model for broader efforts in the Commonwealth to identify and assist returning students.
- For Virginians who possess 60 or more credits toward a bachelor’s degree, the State Council of Higher Education for Virginia (SCHEV), as part of the Commonwealth’s federal College Access Challenge Grant, will be undertaking a study of: (1) the scope and demography of the potential pool of adults who could enroll in a baccalaureate degree completion program; (2) the number of adults enrolling in and attaining degrees from adult degree completion programs and other nontraditional offerings at four-year institutions; and (3) whether these programs are aligned with the needs of employers and the economic development needs of the state. The opportunity may exist to use grant funding for this purpose on a broader basis in the future.
- SCHEV has created a link on its website for “Adults Completing their Bachelor’s Degree.” The site links visitors to institutions that offer degree-completion programs, adult education programs, courses offered in evenings, on weekends, and online, as well as programs certified by military Servicemembers Opportunity Colleges, programs in high-demand fields, and information about financial aid. This site can be enhanced or spun off as a free-standing electronic portal of the Commonwealth, similar to the “Education Wizard” portal of the Virginia Community College System, which likewise can be enhanced and marketed for this purpose.
- Virginia was selected by the National Governors Association to host a Governor's Forum on Postsecondary Credential Attainment by Adult Workers. In October 2010, this forum brought together policy-makers and practitioners to explore best practices in and scaling-up of successful efforts. A Post-Forum Action Plan contains strategies to continue the conversation in Virginia and move forward with key program initiatives.
- The regional higher education centers across the Commonwealth provide convenient degree-completion opportunities to citizens in their local communities. These centers represent significant opportunities to expand course and program offerings targeted at

the needs of local employers. A “completion consortium” of public and private institutions could help provide instructional content to these centers.

In addition to conducting a comprehensive analysis to help determine how many of the 900,000 Virginians with partial credit are close to the obtaining a degree and how they can best be encouraged and assisted to that end by the Commonwealth, the Commission believes that a consortium (or consortia) of public and private institutions can provide valuable assistance in this area. Both in-person and online course offerings have a role to play in meeting the need and could be the object of such joint effort.

Several public college presidents, including members of the Commission, have discussed opportunities for their institutions to collaborate in providing online course content, perhaps even complete degree programs in several core disciplines, targeted at the non-traditional student population. They envision the degrees would be conferred by a separate entity—either an existing institution or another organization created for this purpose—rather than their own universities. This is one of several ways that colleges and universities can put their instructional resources to use beyond their own campuses, resulting in more high-quality instruction at remote locations and a more cost-efficient leveraging of scarce higher education resources—an area of innovation discussed in greater detail in a later section of this report. The Commission intends to explore both the need for such collaboration and the potential logistics in the coming months.

Improving Retention and Graduation Rates. The third major strategy for increased degree attainment focuses on the other side of the coin just discussed—reducing the number of people who leave college with some credit but no degree. To state the matter positively, incremental improvement in the retention and graduation of students who enroll in college in Virginia can have a very positive impact on college degree attainment while reducing cost—indeed, waste—currently incurred throughout the system.

The “waste” occurs when students enroll in college, consuming their families’ earnings, state tax dollars, institutional resources, and often their own money, only to drop out before completing a degree. Studies identify various causes for this attrition—the need to work because of financial pressures, academic unpreparedness, transition adjustment difficulties, and uncertainty about education and occupational goals—but there is no doubt that when it occurs, for whatever reason, an opportunity is missed and resources are wasted. A recent report by the American Institutes of Research documented that Virginia taxpayers spent more than \$177 million over five years (2003-2008) on 35,461 college students who did not return after their first year.¹⁴ This statistic is unsettling, and it is little consolation that the same organization found that Virginia is outperforming many other states in both retention and graduation rates.

Using the graduation metric that is standard in America higher education—the six-year freshman cohort graduation rate—Virginia’s four-year institutions have an average 68.3

¹⁴ Schneider, M. (2010, October). *Finishing the First Lap: The Cost of First-Year Student Attrition in America’s Four-Year Colleges and Universities*. American Institutes for Research. Retrieved from http://www.air.org/news/index.cfm?fa=viewContent&content_id=989

percent completion rate, compared with a national average of 55.9 percent. Among those four-year institutions, the rates range widely—from a low of about 32 percent to a high of 93 percent. Some of these variations are expected, as the institutions have different missions and enroll students with differing socioeconomic profiles and academic credentials. A more useful comparison may be with peer institutions that serve similar student populations.

SCHEV has analyzed the potential impact on degree attainment from improvement in completion rates by Virginia’s public four-year college and universities. If those institutions were to improve so that all at least match the median graduation rates of their designated peer institutions, the aggregate result would be the conferral of approximately 8,000 additional degrees by 2025. Focusing only on the public four-year institutions in Virginia with graduation rates below 75 percent, SCHEV finds that every one-percent improvement in graduation rates across those institutions by 2025 would result in 1,100 more degrees system-wide.

The Commission believes improved graduation rates should be a high priority in Virginia’s overall higher education reform and investment strategy. A comprehensive Virginia-specific study of the causes of attrition and the corresponding remedies should be commissioned, and the extensive body of literature and policy recommendations on this subject from respected organizations should be mined further. Three key recommendations, however, need not await that further study:

- First, the Commonwealth’s new higher education funding model should incorporate financial incentives for improved completion rates, with a focus on meeting or exceeding peer institution performance.
- Second, the next set of restructuring reforms (discussed later in this report) should establish a collaborative and consultative process through which specific—and increasing—expectations are set for each institution regarding the number of degrees to be conferred on Virginia students by the institution.
- Third, for enrollment-related funding purposes, the Commonwealth should transition to enrollment calculation methodology that is based on end-of-term data, thereby excluding from the calculation students who withdraw or otherwise do not complete their work.

Setting degree expectations for each institution, providing incentives for improved retention and graduation rates, and taking retention into consideration in measuring enrollment are sensible steps that will help move the Commonwealth cost-efficiently toward its overall degree attainment goals.

As they respond to completion incentives and pursue specific degree-conferral goals, some Virginia higher education institutions will want to take a close look at enhancing targeted student services that support academic performance and adjustment to college study. In a recent analysis commissioned by the Virginia Business Higher Education

Council, the National Center for Higher Education Management Systems (NCHEMS) noted the well-documented impact of such services in improving retention. Tutorial assistance and other student services have been shown to make an especially significant difference in the success of low-income students and under-represented student populations following admission to college. While NCHEMS noted that data reported by Virginia institutions may not fully reflect the level of current expenditures, it reported that Virginia's colleges appear to spend considerably less on these services than their peer institutions—approximately \$500 per student less on average at four-year institutions, and about \$600 per student less at community colleges.

The Commission is continuing to assess the impact of the various strategies for higher degree attainment described in this section of the report. To match the top-performing states and countries in college degree attainment and personal income, NCHEMS projects that Virginia will need to confer 735 more public college degrees and 315 more private college degrees each year, year over year, through 2025. Of course, the mix of public and private degrees can, and likely will, vary in practice, as will the actual yearly progress. Nevertheless, those numbers provide a point of reference by showing the magnitude of the incremental annual progress that must be made to reach the Governor's cumulative 100,000-degree goal for the public institutions and the corresponding private degree increase.

The potential of various degree-attainment strategies is readily calculable for illustrative purposes. A five-percent increase in public institution enrollments at current graduation rates would yield 5,000-10,000 additional degrees by 2025, depending on the timing and location of the enrollment increases. If the Commonwealth can identify just 5% of the 900,000 citizens with partial college credit and help them complete a degree, that would create another 45,000 degrees. Improving graduation rates so that Virginia's public institutions match the median performance of their peers by 2025 would yield roughly 8,000 additional degrees. Indeed, taking into account completion progress only at the public institutions with graduation rates currently below 75 percent, every one-percent improvement at those institutions would result in approximately 1,100 more degrees system-wide. Similarly, each one-percent increase in the graduation rate for community colleges with rates below 25 percent would yield approximately 1,500 new degrees.

The actual segmentation showing the locus of additional degree conferral at specific public and private institutions will, of course, be an iterative process influenced by the policies and incentives that are adopted, local initiatives, and the planning discussions among institutional managers and state-level policymakers that ensue. The Commission believes the Commonwealth's policies, including its codified funding model and the incentives incorporated therein, should be designed to promote progress in all three key areas—enrollment growth, partial credit completion, and improved graduation rates. While it is desirable and perhaps inevitable that particular policies, practices and incentives will be adjusted in coming years in light of results, it is clear that progress in moving Virginia to a significantly higher level of college degree attainment over the next decade-and-a-half will require simultaneous and sustained effort on all three fronts.

STEM Degree Initiative

Closely connected to the 100,000-degree goal is Virginia's crucial focus on raising educational attainment in high-demand, high-earning disciplines, such as science, technology, math, science and healthcare. Before addressing the need for a major STEM degree initiative in the Commonwealth and the Commission's recommendations in that area, it is important to note the pervasive importance of introducing economic opportunity metrics into all facets of higher education reform and investment in Virginia.

The Commission does not gainsay in the least the non-economic benefits from a college education. Indeed, when it is done well, much of what occurs in the course of obtaining a college degree, as in earlier and later stages of education, contributes to the development of character and other qualities that are vital for good citizenship and personal fulfillment—benefits not ordinarily or easily expressed in economic terms. Since the earliest days of the American Republic and well before, our colleges have played an indispensable role in developing the whole person, in equipping him or her to think critically, and in supplying the broad context in which women and men of goodwill can move consequentially in their time, weaving their own bright threads into the rich fabric of experience and progress that is civilization. The Commission's proposals for long-term investment and reform in Virginia's higher education system are as essential for future excellence in liberal arts education generally, including in the humanities, as they are for progress in scientific, technological and vocational realms. This understanding has guided the Commission throughout our work to date, and will continue to guide us as we complete our charge.

A keen sense of our time's distinctive challenges and opportunities requires, however, that we keep one eye firmly fixed on the economic implications of what Virginia produces through its higher education system. The Governor has aptly noted that some degrees in some disciplines can be expensive to provide and costly to obtain yet yield relatively little in the form of enhanced earning potential. Given the times' competitive pressures and scarce resources, it is vital that the Commonwealth have access to the economic impact information necessary to target its investments where they will produce the greatest returns. Likewise, policymakers and administrators at our higher education institutions need to know the marketplace impact of various degree programs so they can allocate resources optimally. Perhaps most important, the students and families who invest their precious income, savings and time in pursuit of a college degree must be equipped to make prudent choices that will lead to expanding economic opportunity.

The Commission thus recommends that the Commonwealth and its colleges and universities, assisted by knowledgeable experts, develop a robust set of assessment tools—"economic opportunity metrics"—that will enable everyone involved in the higher education enterprise to better understand the economic impact of particular degree programs at particular institutions. At the request of the Virginia Business Higher Education Council, NCHEMS has already done some important preliminary work for

Virginia institutions in this arena, including developing a “cost per degree” assessment that reflects economic value based on degree holders’ median earnings. A one-size-fits-all approach is not advisable given the diversity of Virginia institutions, programs, and constituencies. Instead, a range of performance measures should be developed, included various gauges of marketplace demand, earnings potential, employer satisfaction, and other indicators of historical and projected value. The bottom line is that better information about the absolute and relative economic value of degree programs, provided transparently to all participants in the process, is calculated to produce better resource allocation decisions and a higher return on investment for the Commonwealth and individual citizens alike.

Such analyses have already been well documented, broadly speaking, the high return on investment associated with increased degree attainment in the STEM are as well as the multiplier effect that STEM jobs have on non-STEM related employment. As noted in the previously cited follow-up to the National Academy of Science’s *Gathering Storm* report, the innovation that drives the American economy will come largely from advances in science and engineering. “While only four percent of the nation’s work force is composed of scientists and engineers, this group disproportionately creates jobs for the other 96 percent.”¹⁵

The President’s Council of Advisors in Science and Technology recently released a strategy for K-12 STEM education in which the Council commented that the “success of the United States in the 21st century—its wealth and welfare—will depend on the ideas and skills of its population. These have always been the Nation’s most important assets. As the world becomes increasingly technological, the value of these national assets will be determined in no small measure by the effectiveness of science, technology, engineering, and mathematics (STEM) education in the United States.”¹⁶ While the recent report focused on K-12 education, a future report will focus on post-secondary STEM education. One of the report’s key recommendations is that ALL students should be inspired and prepared to learn STEM subject matter.

The Commission recognizes that many important STEM programs and initiatives underway at the local level are already inspiring and preparing young people to study math and science and are strengthening the skills of teachers to develop and deliver innovative and effective STEM-related curriculum. In secondary education, we have STEM high school academies, Governor’s schools, FIRST LEGO League and Robotics programs in addition to programs that bring K-12 and higher education together to foster interest and STEM skill development. The Virginia Mathematics and Science Coalition, Space Grant Consortium and other partnerships with business and industry, such as the SySTEMic Solutions Initiative with Northern Virginia Community College in Prince

¹⁵ Reference National Science Board, Science and Engineering Indicators 2010. Arlington, VA: National Science Foundation (NSB 10-01, Figure 3.3)

¹⁶ Prepare and Inspire: K-12 Education and Science, Technology, Engineering, and Math (STEM) for America’s Future (Report to the President) by the President’s Council of Advisors on Science and Technology, September 2010.

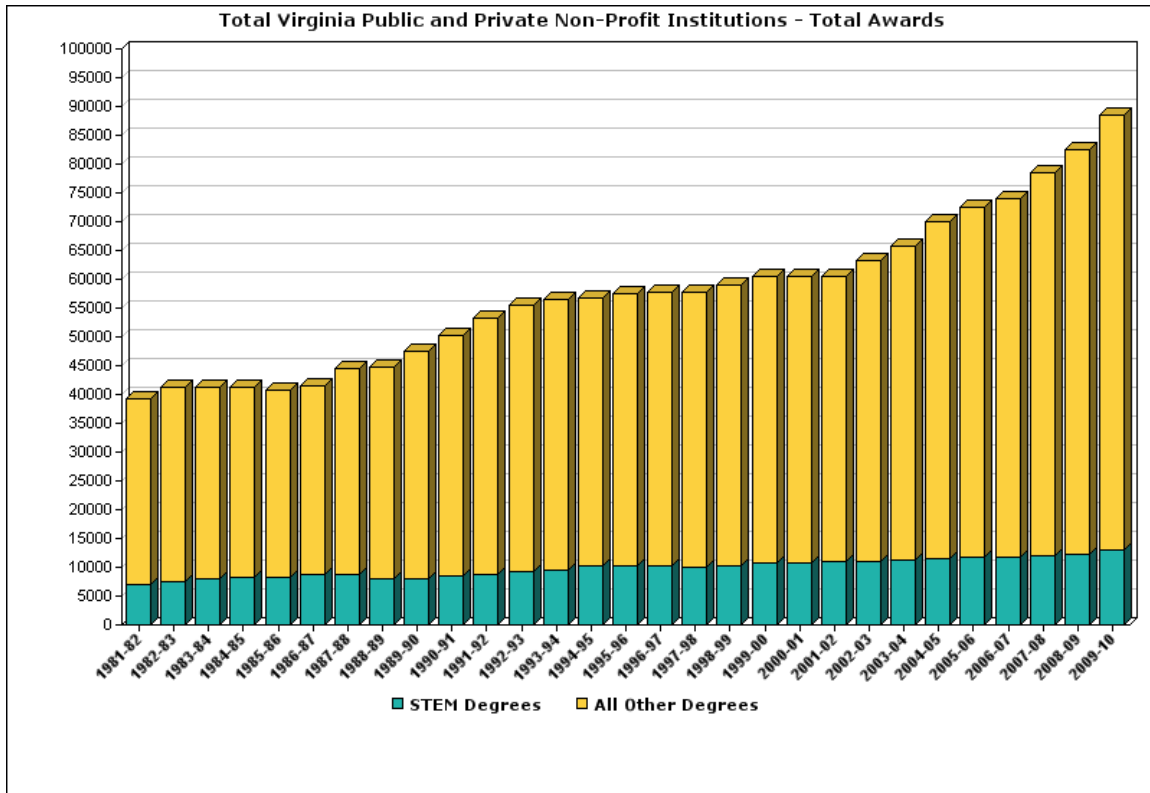
William County and NASA Langley's K-20 education programs in Hampton, are all having a positive impact.

Enhancing professional development in science and math for K-12 educators is a priority that various projects are addressing. Among these efforts is the grant-funded Virginia Initiative for Science Teaching and Achievement (VISTA), a partnership among 47 school districts, six universities, and the Virginia Department of Education that is building a comprehensive professional development model to improve K-12 science teaching and increase student performance. The initiative holds promise for bringing the strengths of post-secondary research programs and STEM expertise into high school classrooms. Secondary school science teachers will be given on-the-job and graduate-level classroom professional development supported by online resources. The higher education partners participating in the initiative include George Mason University, James Madison University, College of William and Mary, University of Virginia, Virginia Commonwealth University, and Virginia Tech.

The Virginia Council of Graduate Schools is another resource for strengthening the skills of aspiring teachers, future college faculty, and professionals. The Virginia Math and Science Coalition's Statewide Masters Program and the Commonwealth Graduate Engineering Program are two examples of collaborative masters programs that strengthen advanced STEM knowledge throughout the Commonwealth by leveraging existing institutional strengths rather than duplicating coursework and programs.

The Commonwealth offers 113 STEM programs at our public and private higher education institutions, ranging from agricultural business technology, to human genetics, to toxicology. Despite Virginia's relatively high ranking on the percentage of STEM degrees awarded from public and private institutions, that percentage has been declining in recent years, causing STEM degree production in Virginia to remain fairly flat despite significant enrollment increases. This trend is highly disturbing given the rapidly growing demand for STEM skills and knowledge in the Commonwealth. A recent report from the Virginia Employment Commission projected a 41-percent increase in the professional, scientific and technical sectors, including engineering and computer science jobs, through 2018. Sizeable increases are also projected to occur in health-care related fields.¹⁷

¹⁷ Virginia Employment Commission, "Industry and Occupational Projections, 2008-2018," Occupational Employment Statistics (OES) Survey, 2009.



In addition to the salutary goal of increasing the overall number of college degrees granted in Virginia, the Commission recommends that concerted action be taken specifically to increase the number of students completing degrees in STEM fields, including medicine and other health-related areas of study. To help develop and guide implementation of a comprehensive plan for higher STEM degree attainment in Virginia, the Commission recommends formation of a public-private entity (similar in some respects to the National Science Foundation) comprised of private-sector leaders, distinguished representatives from the scientific community (including retired military, government scientists, and researchers), educational experts, and responsible government officials, among others. Its charge would be to help devise, coordinate and support state efforts to make Virginia a national leader in science and technology and in STEM scholarship and research. Among the priority issues to be addressed would be the need for additional STEM enrollment, capacity, and resources at colleges and universities, greater coordination, innovation, and private sector collaboration in K-12 STEM initiatives, and the assessment of, and alignment of policies with marketplace demand.

The Commission commends efforts already underway to strengthen math and science education in grades K-12 and believes that future success in increasing STEM degrees in Virginia will require stepped-up efforts, including:

- Early diagnosis of math and science deficiencies;
- Remediation programs;
- Acceleration programs;
- Enrichment opportunities;
- Advisory programs;
- Incentives for getting students interested in math and science fields; and
- Leveraging private resources to assist with scholarships, scientific equipment, and youth programming.

A number of these areas will require harnessing private-sector assistance and promoting public-private partnerships like several that have achieved initial success in communities across Virginia. The recommended public-private entity would assist in coordinating and mobilizing these efforts.

The Commission believes that the following measures could substantially help in promoting STEM degree production in Virginia:

1. Increasing the number of STEM K-12 academies, including elementary and middle school programs (currently nine localities have high school academies: Halifax, Hampton, Arlington, Suffolk, Russell, Stafford, Loudoun, Chesterfield, and Richmond);
2. Establishing a process to create regional academic-year Governor's Schools for gifted students in grades six through eight focusing on science, technology, engineering and mathematics. This concept is an extension of the current network of academic-year Governor's Schools for gifted high school students;
3. Initiating an Early College Mathematics and Science Scholars Program similar to the existing Early College Scholars Program to encourage high school students to earn at least 15 hours of transferable college credit with a concentration in mathematics and science while completing the requirements for an advanced studies diploma;
4. Expanding advanced placement course offerings through Virtual Virginia—the Commonwealth's online program;
5. Implementing the recommendations of the Virginia STEM Survey of Lab Skills Report sponsored by the Center for Excellence in Education to determine where improvement in teacher preparedness can be made for laboratory courses, including the feasibility of creating regional laboratory facilities (especially in rural areas of the state, where secondary schools

could use facilities of the Virginia Community College System and/or corporate laboratories for instruction or training);

6. Encouraging a Virginia university to establish an “Early College Mathematics and Science Lab School” as authorized in the College Partnership Laboratory School legislation passed by the 2010 General Assembly;

7. Expanding professional development opportunities to assist teachers with the acquisition of knowledge, skills, resources for helping students become STEM literate;

8. Establishing the Center for Training and Teaching, or similar programs, with the aim of enriching and diversifying instruction in K-12, undergraduate, and graduate education in science, technology, engineering, and mathematics (as proposed by Hampton University);

9. Creating a statewide STEM industry internship program to operate in partnership with industry throughout the Commonwealth. The program could be modeled after the Virginia Space Grant Consortium program and would offer undergraduates an opportunity for real-world work experience and provide Virginia’s industries with access to qualified interns. Regional technology councils could serve as the program’s conduit to industry with advertising and linking to interested industry partners; and

10. Developing a STEM certificate for undergraduate liberal arts majors.

The Commission recommends that consideration be given, as resources permit, to targeting some component of tuition assistance to incentivize college students to pursue and complete STEM degrees, and to establishing a program to provide matching grants to public and non-profit private colleges to assist these institutions in constructing or renovating facilities used primarily for the teaching of STEM subjects and acquiring scientific equipment to be used primarily for such STEM instruction.

To meet anticipated demand for STEM degrees, according to one respected economist’s presentation to the Commission,¹⁸ Virginia will need to prepare 100,000 additional workers with STEM degrees over the next decade. To better understand what types of degrees will meet the demand, the Commission recommends conducting a degree demand analysis for careers that require science, technology and engineering-related degrees. (A math degree analysis was presented during the Degree Attainment Committee’s meeting on August 31.) The analysis also would entail preparing a corresponding occupation demand analysis to project growth trends for the industries that will employ these 100,000 STEM job seekers in Virginia over the next 15 years. The analysis should specifically address the industries and market sectors the Commonwealth

¹⁸ Chmura, C. (2010, August). Job Demand Forecasting. Presentation to the Governor’s Commission on Higher Education Reform, Innovation, and Investment, Hampton, VA.

Innovation Index and the Virginia Economic Development Partnership (“VEDP”) identify as centers of growth in the 21st century, including aerospace, automotive, plastics and advanced materials, energy, global logistics, life sciences, and technology, modeling and simulation.

Research and Development Initiative

The third major component of the Commission’s Economic Opportunity recommendations relate to university-based research and development activities.

In March 2010, the Nelson A. Rockefeller Institute of Government at the State University of New York (Albany) released an important study entitled, “A New Paradigm for Economic Development: How Higher Education Institutions are Working to Revitalize Their Regional and State Economies” (authors David F. Shaffer and David J. Wright). The report opens by noting two major turning points for the country that were the direct result of higher education. First was passage of the Morrill Act in 1862, which created the land grant university and its mission of education and economic development through agriculture and the mechanical arts. The second turning point occurred with the passage of the GI bill, which provided higher education opportunities to more than a million veterans, resulting in a more educated workforce that dramatically increased the growth of our economy. The study’s authors suggest that a third major turning point is occurring with the transformation of higher education institutions into economic development engines. “In states across America, higher education systems, universities, and community colleges are working to help their regions and states advance in the new knowledge economy. They are marshalling each of their core responsibilities—education, innovation, knowledge transfer, and community engagement—in ways designed to spur economic development.”

In addition to their educational missions, Virginia’s public and private higher education institutions conduct important research and development in science and technology to enhance the health and well-being of our citizens and growth of our economy. Six doctoral public institutions as well as a growing number of comprehensive institutions conduct research on topics ranging from aerospace engineering to nanotechnology. In addition, Hampton University and George Washington University both have strong research programs in the Commonwealth. Each of the public research universities maintains a university-sponsored research park that provides opportunities for private companies to co-locate and partner on major research initiatives. These six parks plus two federal facilities provide a significant resource for further strengthening research capabilities throughout the state.¹⁹

The Commonwealth also supports or contributes to the support of a number of research facilities, including the Jefferson Lab, the Institute for Advanced Learning and Research, Virginia Institute for Marine Science, and the network of twelve Agricultural Experiment Stations scattered throughout the state. Some universities have leveraged state support with other funding sources to create research university facilities like Old Dominion

¹⁹See http://www.yesvirginia.org/whyvirginia/innovated_RandD/university_parks.aspx.

University's Virginia Modeling, Analysis and Simulation Center. Research also has been a priority of the Tobacco Indemnification and Community Revitalization Commission, which funded over \$37 million in research projects in the tobacco region in the past decade. Last year, the Tobacco Commission provided funding for five regional energy research centers to strengthen the link between innovation and job creation with partnerships from industry and Virginia educational facilities.

Virginia's colleges and universities serve as a powerful economic engine for the Commonwealth through research and development activities. The Weldon Cooper Center economic impact study described earlier in this report documented the economic impact of university research programs at the public institutions—nearly \$600 million annually in increased GDP, nearly 13,000 jobs, and approximately \$72 million in tax revenues to the state. This does not include the significant documented impact of start-up companies that have resulted from commercialization of university research.

The Commonwealth is fortunate to be home to the largest concentration of federal R&D establishments in the nation, including 25 percent of the total number of federally funded R&D research centers. This concentration also includes more than 20 defense-related labs and R&D centers and 19 federal civilian research centers, including the new Homeland Security Institute, NASA's Langley Research Center, and the federal Department of Energy's unique Thomas Jefferson National Accelerator Facility (Jefferson Lab).²⁰ Despite our close proximity to many federal agencies, however, Virginia ranked only 15th in the nation in 2008 total R&D expenditures, and only two of our research institutions ranked in the nation's top 100 (Virginia Tech at 46th and the University of Virginia at 70th.) Virginia Commonwealth University was close behind at 108th.

The most notable state investments in university-sponsored research in recent years began with Governor Gilmore's creation of the Commonwealth Technology & Research Fund in 2000. The impact of this program, though curtailed by the recession early in the past decade, created momentum for increased research funding. Governor Warner then expanded the effort significantly through a multi-faceted Commonwealth Research Initiative in the 2006-08 biennial budget. This initiative provided \$83 million for research-related buildings at four Virginia doctoral institutions and \$65 million for directed research, including \$3 million for the Commonwealth Technology Research Fund.

When the Commonwealth Research Initiative was passed, language in the Appropriations Act required institutions receiving the research funding to report annually on the use of funds. Thereafter, the University of Virginia reported a 400-percent return in FY2009 from its \$2.2 million state investment, receiving an additional \$13.74 million in external federal and private funding. The University of Virginia initiative substantially increased research capabilities in bioscience and bioengineering. Other noteworthy success stories

²⁰ Praxis Strategy Group and Joel Kotkin, "Enterprising States- Creating Jobs, Economic Development, and Prosperity in Challenging Times," U.S. Chamber of Commerce and the National Chamber Foundation, May 2010. <http://ncf.uschamber.com/enterprising-states/>.

were reflected in the reports of George Mason University (expansion of bioengineering program) and Virginia Tech (infectious disease research).

In 2006, the Commonwealth provided support to establish SRI Shenandoah Valley and the Center for Advanced Drug Research in Harrisonburg, a partnership with James Madison University (JMU), Rockingham County, the City of Harrisonburg, the Virginia Economic Development Partnership, and the Shenandoah Valley Partnership. In addition to biosciences research, SRI researchers have also been working on regional economic development and educational needs through a variety of grant projects.

In 2008, the General Assembly merged the Innovative Technology Authority and the Virginia Research Technology Advisory Committee, creating the Innovation and Entrepreneurship Investment Authority (“IEIA”) and charging it with establishing a statewide research and development strategic roadmap. The roadmap will identify common themes among the state’s research universities and result in recommendations for alignment of R&D and economic growth in the Commonwealth. In addition, IEIA is charged with creating the Commonwealth Innovation Index. The purpose of the Index is to foster the formation, retention, and expansion of technology-based economic development opportunities. The Center for Innovative Technology, which is the operating arm of the Innovative Technology Authority, has been working with the Commonwealth’s ten regional technology councils and with other local leaders to better understand the innovations envisioned in each of the regions and establish the strategic planning and management tool.

Despite the documented high return on research investment, funding for the Commonwealth Research Initiative has been reduced by almost two-thirds in response to the current recession—from a high of \$32.4 million in operating support in FY 2007 for to a low of \$11.7 million in FY 2012. Further, the Commonwealth Research Commercialization Fund, Virginia’s principal entity for supporting commercialization of research by Virginia’s institutions, is not currently funded at all.

Some targeted investments have been made. State support was provided to two research institutions to help recruit a large advanced manufacturer to the state to build a major manufacturing facility and to create a not-for-profit entity focused on applied research—a first for Virginia’s Economic Development Partnership. In 2007, the Commonwealth put together an attractive package of incentives to entice Rolls Royce to build an advanced manufacturing plant in Prince George County. A significant aspect of the package was funding for a major research partnership with Virginia Tech and the University of Virginia. The Virginia Community College System also was included in the incentive package to assist with workforce development, and Virginia State University received funding for a manufacturing and logistics program. Two major research facilities were proposed in the incentive package—the Commonwealth Center for Advanced Manufacturing (CCAM) and the Center for Aerospace Propulsion Systems (CAPS). CCAM is under construction and will open in late 2011. It is a not-for-profit, membership-based scientific, research and educational 501(c) (3) corporation that is focused on physical applied research for Rolls Royce, but it also offers a unique

opportunity for additional industry partners and higher education institutions to participate in applied research.

Virginia's higher education system continues to help the Commonwealth attract companies that need cutting-edge research expertise and a well-trained workforce. In April 2010, for example, Northrop Grumman Corporation executives cited opportunities to partner with George Mason University as a reason they chose to move the company's headquarters from Los Angeles to Fairfax. Future business recruitment will include more partnerships between higher education institutions and companies interested in building innovation and accessing an educated workforce.

Against this backdrop, the Commission's work, through the Regional Strategies Committee, has focused on evaluating current research programs and partnerships and providing recommendations for policy changes and future funding. The objective is to increase the economic return on investment by encouraging formation of public-private research partnerships and by growing our higher education institutions' research capabilities—actions that have a direct positive impact on job creation and economic development. We have followed closely the parallel work on research by the Governor's Commission on Economic Development and Job Creation, and many of the strategies included in its recent Final Report align with the recommendations contained herein.

Statewide R&D Strategic Roadmap. The Innovation and Entrepreneurship Investment Authority (IEIA) should continue work on the development of a statewide R&D strategic roadmap that identifies strategic direction from university research assets, capabilities and activities, particularly those related to federally-funded research, and aligns Virginia's economic development activities with additional R&D investments. The Board of IEIA's operating arm, the Center for Innovative Technology (CIT) established the Strategic R&D Committee to oversee this activity. The Committee envisions developing the roadmap through a collaborative process and will engage private and public institutions of higher education as well as the private sector. Once complete, the Commonwealth will have a better understanding of common themes among the state's research universities and how research activities can be directed for maximum effect.

The Commission recognizes the need for a champion to create visibility for research initiatives, highlight strengths, facilitate partnerships with business and industry, and seek out major federal research opportunities. Greater coordination among VEDP and the research universities would assist in exploiting synergies among the higher education institutions' research programs and in bringing those resources to bear most effectively in the business recruitment process and other economic development efforts.

Federally-Funded Research. Virginia needs a more aggressive, coordinated, and sustained effort to pursue federally funded research projects. Such projects offer the most immediate opportunity to significantly improve our universities' national rankings as premier research institutions. To accomplish this goal, the Commonwealth's highest elected officials—state and federal—should make it a priority to help Virginia

universities attract more research through key agencies such as the National Institutes of Health, National Science Foundation, Department of Defense and Department of Energy.

A coordinated statewide federal research strategy should take full advantage of the existing strengths and priorities reflected in the statewide R&D strategic roadmap and the Commonwealth Innovation Index. For example, the Southeastern Universities Research Association (SURA) offers an immediate opportunity for a coordinated effort advocating the continuous upgrading of the Jefferson Lab in Newport News through the Department of Energy. Investments in the Jefferson Lab yield short-term benefits in the form of construction and technology jobs, and they greatly increase the long-term possibilities for technology transfer and high-tech business development on the Peninsula and through the universities that conduct research at the Lab.

Emerging Technologies Fund. The Commission recommends establishment of an emerging technologies fund as a vehicle for bundling and strengthening research-enhancing initiatives—including eminent scholar attraction, research and commercialization funding, seed-stage funding and the higher education equipment trust fund—that are currently underway to some degree in the Commonwealth. These programs mirror the core components of Texas’s Emerging Technology Fund, and they require a sustained commitment:

- STEM Eminent Scholars Program: Within the proposed emerging technologies fund structure, the Commonwealth should provide eminent-scholar funding so that in STEM and other high-demand disciplines universities have the resources to attract and retain key faculty with a proven track record of (i) obtaining research funding and (ii) commercializing technology.
- Commonwealth Research Commercialization Fund: The Commonwealth Research Commercialization Fund, previously known as the Commonwealth Technology Research Fund, should be a priority for new resources. The Fund’s emphasis is translational research funding for targeted, promising technologies that offer opportunities for commercialization. Sectors and activities identified as eligible for funding should align with the Commonwealth’s strategic priorities. Proposals for grants from the Fund should be peer reviewed by subject-matter experts. Criteria for awards should incorporate incentives for collaboration among Virginia universities, partnering with the private sector, and attracting matching funds that may be required for large federally funded research projects. The matching component is critical to the emerging technologies fund structure so as to allow for a source of matching funds for higher education and companies seeking grant and other funding sources for commercialization activities.

These programs complement the emerging technologies fund concept, and the Commission recommends their continued support:

- Seed Stage Funding: The Commonwealth should support CIT’s existing convertible debt funding mechanism in order to exponentially increase new

technology company formation, including proof-of-concept start-up companies based on research and commercialization at Virginia universities. This mechanism—CIT GAP Funds—is a family of seed stage funds developed and managed by CIT that addresses Virginia’s early seed stage funding “gap” by placing investments in high-potential start-up companies across a range of sectors, including information technology, biotech and life science, energy, advanced materials, sensors, and electronics.

- Higher Education Equipment Trust Fund: The Commonwealth should commit to providing the Higher Education Equipment Trust Fund with sufficient funding to assist universities in acquiring equipment needed to support world-class research.

IP Commercialization Incentives. Commercializing intellectual property (IP) developed by Virginia’s higher education institutions is an essential component of innovation-based economic development. Virginia has a far better chance of creating and growing a company if the basic intellectual capital for the new company is generated within the Commonwealth. Improving the speed and ease in which university-based research can be commercialized is critical. University IP offices, which are the front line in research commercialization efforts, need resources adequate for their mission. The Commission recommends creating a fund to support university IP offices based on competitive performance metrics tied to success in commercializing intellectual property and in stimulating private-sector job growth and economic activity. Such a fund could provide a cash incentive to universities that license IP to small companies in exchange for equity in those companies, provided the university agrees to share a percentage of the equity with the Commonwealth. This approach has the potential to unleash new commercialization opportunities that may not provide an immediate return but in time prove to be smart investments.

Regional Centers of Excellence. A number of centers of excellence already reside in the Commonwealth. Regional research centers can help leverage the research assets that exist across the state and align them with the Commonwealth’s statewide R&D strategic roadmap. The Commonwealth Center for Advanced Manufacturing and Areva’s Chemistry and Materials Center are models of regional research centers that expedite research and development. A proposal by Hampton University to establish four centers of excellence across the state also deserves close attention. Such centers are driven by the private sector and can be a valuable tool in increasing overall research investment in the Commonwealth.

R&D Income Tax Credit. The Commission also recommends modification of Virginia’s current tax laws to encourage private sector funding of research and development. The Commonwealth has an opportunity to increase the amount of corporate-funded directed research at Virginia’s higher education institutions by creating a tax credit for joint research projects by businesses and universities. Currently, Virginia only has a sales tax exemption that is limited to purchases used directly in research and development; we need an income tax credit for research and development expenditures. As noted in the Final Report of the Governor’s Commission on Economic Development

and Job Creation, 38 other states provide this tax credit. Virginia is at a significant competitive disadvantage in this crucial area, and a correction is overdue.

(2) Reform-Based Investment

With a top-performing higher education system that routinely receives high marks for quality, cost-efficiency and value, all Virginians—including those most directly involved in the higher education enterprise—have much reason to be proud, and grateful. The successes and accolades have come only through much dedication and effort at all levels.

With success, however, comes the tendency toward complacency. If we mean to be a pace-setting performer nationally and competitive internationally, we cannot rest on our laurels. And we certainly cannot continue to draw away from the higher education system the vital resources that are necessary to preserve excellence and serve more students. In the most basic sense, it is irrational and self-defeating to respond to a time of unprecedented economic hardship by gutting the state program with the highest demonstrated economic return and by driving up the cost for students and parents at the time when they can least afford it and most need it. All Virginians appreciate that tough decisions have been necessary to balance the books, whether it is the family checkbook or the state budget. But as the Commonwealth turns the corner on these unprecedented difficulties, a renewed commitment to higher education and its economic benefits must be a top priority.

The need to reverse the recent pattern of deep disinvestment in higher education is clear, but so is the infeasibility of delivering educational services the same way it has been done before. Simply stated, there is no realistic prospect of sufficient additional funding adequate to provide a high-quality college education to significantly more students relying wholly on traditional approaches. The need for innovation and reform therefore has occupied much of the Commission's attention. Because we have an excellent and resilient higher education system full of imaginative and talented people, we believe Virginia is ideally positioned to lead the way for the nation in implementing innovative new instructional approaches and models of service delivery.

Higher education cost-containment strategies in Virginia have taken various forms during the past decade as state resources have ebbed sharply. Savings have been pursued primarily in the areas of energy management, facilities and infrastructure, business services and processes, personnel, and academic programs, and the Restructuring Act has facilitated progress on these fronts consistent with the distinctive situations of the institutions. The colleges (public and private) have reduced costs through various collaborative approaches. For example, a number of public institutions collaborate on procurement through the Virginia Association of State Colleges and University Purchasing Professionals, and the Council of Independent Colleges in Virginia likewise pools the resources and purchasing power of member institutions in areas such as healthcare. The Virtual Library of Virginia enables academic libraries at public and private not-for-profit institutions to avoid duplication, leverage resources, and maximize purchasing power. Many more examples could be cited.

While it is beyond the scope of this Interim Report to catalog all ongoing and anticipated cost-saving and collaborative initiatives, it must be emphasized that a plethora of partnership arrangements between and among higher education institutions, state and local government agencies, businesses, associations and other organizations have allowed Virginia to leverage its higher education investment broadly. This has enabled the system, despite its decentralized character, to perform at a high level with comparatively low cost to taxpayers. Ultimately, that leveraging of private resources accounts to a large degree for the high return on investment documented earlier in this report.

The Commission's exploration of opportunities for reform and innovation has led it to examine a wide range of best practices nationally and internationally as well as the thoughtful suggestions of many experts, think-tanks, and experienced participants and observers within the state and without.²¹ While cost-containment efforts must continue to wring the maximum from every tax and tuition dollar, the Commission has concentrated its efforts in four areas where we see the greatest potential for innovation and improvement:

- Optimizing utilization of physical and instructional resources on a year-round basis;
- Using technology-enhanced instruction to deliver greater value to traditional and non-traditional students;
- Creating innovative and economical degree paths to enable more Virginians to complete degrees; and
- Taking system-wide restructuring to the next level and creating an atmosphere of trust and collaboration.

In addition to these four major areas of reform, which apply to virtually all higher education institutions and to the system as a whole, the Commission has closely followed the progress of the Virginia Community College System's Reengineering Task Force, which has developed a number of proposals specific to the community colleges and their distinctive role in achieving Virginia's educational and economic policy goals. The following paragraphs elaborate first on the four cross-cutting areas of initiative and then provide recommendations relating specifically to the community college system.

Year-Round Utilization. With course work primarily concentrated between the months of late August and early May throughout American higher education, few would argue that we are making optimal use of our physical or instructional resources. The Commission has been impressed by the widespread emphasis internationally on year-round instruction and has also considered various promising models for year-round instruction in the United States. In calling on Virginia's higher education community to focus on enhanced utilization of physical and instructional resources throughout the year,

²¹See, e.g., Kathryn Webb Farley, Boris Bruk and Emily Swenson Brock, "Strategies for Achieving Productivity and Efficiencies in Higher Education," November 18, 2010.

the Commission does not suggest a mandated or uniform approach. Given the diversity among higher education institutions and programs in Virginia, optimal utilization will not look the same on every campus.

Tapping unused seasonal capacity at existing institutions promises multiple benefits, from enabling the colleges to enroll more students cost-effectively to enhancing opportunities for timely or expedited degree completion, with cost-saving benefits to tuition-paying students and their parents. The Commission has received informal input from a number of institutions but does not yet have sufficient information to forecast the impact of this initiative. Representatives of some colleges and universities have expressed interest in having their governing boards consider substantial schedule adjustments that could markedly expand summertime instruction. Other institutions have well-established programs and schedules that would be less amenable to significant alteration. Virginia Military Institute (VMI), for example, has a highly refined and long established four-year program of mandatory residential, military-style instruction that could not easily be replicated on a year-round basis. VMI nevertheless has undertaken to make extensive use of its facilities during the summer months, with one third of its cadets taking summer course work and more than half of each entering cadet class voluntarily attending a pre-enrollment summertime transition program on Post that has proven successful in materially improving the first-year retention rate.

While the opportunities for innovation vary, what every institution can do is carefully assess its programming and assets and develop a plan to make the best possible use of its facilities and teaching resources during four seasons of the year rather than only three. The Commission recommends that such an assessment and plan be required of every public institution. Few businesses in today's competitive environment can afford to under-utilize their assets for a third or fourth of the year, and neither can our higher education system.

Technology-Enhanced Instruction. The development of new technology and its acceptance by students and instructors alike has opened many new opportunities for sharing academic resources across the higher education system and delivering enhanced instruction at lower cost. Far from requiring compromises in quality to reduce cost, new methods of technology-enhanced instruction offer opportunities to make high-quality instructional resources available more broadly to students throughout the higher education system. For a generation raised in a dynamic digital environment, appropriate uses of instructional technology also have the advantage of communicating with students through methods and media by which they have become accustomed to receiving information. As an added benefit, once the up-front developmental cost of some forms of technology-enhanced instruction is absorbed, significant ongoing cost savings can also result.

The Commission has embraced a concept that, for shorthand purposes, we have labeled "virtual departments." By this we mean moving toward an environment in which a wider array of instructional resources is made available to students, regardless of institution and location, through the aid of sophisticated (and sometimes interactive) communications

technology. The most immediate potential applications for this new and more robust form of distance learning appear to be in two contexts at opposite ends of the instructional spectrum. At one end are introductory-level courses that, at many universities, already enroll hundreds of students and are taught largely in a lecture format. At the other end of the spectrum are courses in which the total student enrollment is small, including highly specialized fields of study and/or advanced-level courses. At one end of the spectrum, think of Dr. Larry Sabato's Introduction to American Politics course at the University of Virginia, which routinely enrolls 400 students per semester with a waiting list. At the other end, think of a course of study in Arabic language and culture, an undeniably important subject but one that now lacks sufficient demand to justify hiring a professor on every campus. For divergent reasons, both of these situations lend themselves to distance learning applications.

Faculty members often prefer to teach higher-level courses that are closely connected to their own areas of scholarship and expertise and that afford better opportunities for meaningful interaction with students. As a result, some institutions report increased reliance on adjunct professors and graduate students to teach large introductory-level lecture courses. Could overall instruction be improved if students throughout the higher education system could access introductory-level courses taught by the most accomplished and effective lecturers? The answer would seem to be "yes." Would such a resource be utilized on every campus, including smaller liberal arts colleges that typically rely little on large lecture courses? The answer likely is "no." Should Virginia be moving toward a model where more high-quality lectures are available to more students regardless of institution or location? The Commission believes the answer clearly is "yes."

Similarly, in the situation at the other end of the spectrum—the course that is important but not yet in sufficient demand to justify in-person instruction on every campus—technology provides a vehicle for extending academic offerings and opportunity to students regardless of where they choose to enroll. There are many examples around the country today where technology has enabled consortia of institutions to collaborate on instruction, and a few exist in Virginia.

Importantly, Virginia does not start from scratch with distance learning. Successful examples of remote instruction abound, whether it is through Teletechnet at Old Dominion University, the Electronic Campus of Virginia or the Commonwealth Graduate Engineering Program, a graduate education partnership with George Mason University, Old Dominion University, Virginia Commonwealth University, Virginia Tech, and University of Virginia. These and others provide a proven platform on which to build. To do so, however, requires the convergence of instructional resources and communications technology on a much broader basis than is occurring currently.

The Commission believes that every institution of higher education has a role to play in the process of leveraging instructional resources across the system. Each can be a provider of such resources, a consumer, or both. Each institution therefore should be exploring its assets and opportunities and developing a plan to participate. At the same

time, no one should expect valuable instructional resources to be conveyed electronically to other campuses and venues without compensation; a system of payment must be developed. Finally, it is unlikely that the technological infrastructure necessary to make broad-based resource-sharing feasible can be put in place without initiative from the Commonwealth, most likely in the form of an innovative public-private partnership. The Commission, therefore, recommends a three-fold approach:

- Development of a system of financial incentives to encourage instructional resource-sharing across institutions;
- An obligation on the part of each public institution to commence planning its preferred form of participation; and
- A state-level initiative to help provide the needed infrastructure.

A second distinct area of opportunity in the realm of technology-enhanced instruction is course redesign. Here we refer primarily to enhancing instruction by incorporating technology into courses provided through existing two- and four-year degree programs. This includes but is not limited to development of wholly online courses and even online degree programs. It also includes innovative forms of instruction, such as the math emporium at Virginia Tech, that combine online and in-person instruction. At the math emporium, students take a variety of math courses in a computer laboratory environment on a schedule largely of their choosing, solving problems online but having the ability to call upon the assistance of on-site instructors as needed. Virginia Tech acquired and converted a large department store to a high-tech learning environment for this purpose. Although the cost of developing and transitioning instruction from the traditional approach to the math emporium was significant, the university reports that student satisfaction is high, academic performance is enhanced, and the cost of instruction for those courses has declined. In the case of linear algebra, for example, the cost reduction has been from roughly \$91 per student to \$21 per student.

Because the developmental and transitional costs pose a substantial barrier to course redesign, the Commission recommends that Virginia's new funding model for higher education include incentives, perhaps in the form of matching grants, to support institutional efforts to enhance instruction through innovative technology. The Commission further recommends that the Commonwealth enter into a relationship with the accomplished Center for Academic Transformation to advise and assist in the development, implementation and assessment of course redesign strategies and proposals.

A third area of focus related to instructional technology is the provision of online course options for non-traditional students. Given the importance the Commission attaches to increasing degree attainment by students with partial college credit, it is noteworthy that online course offerings are often the only viable option for students who have job obligations, must support and care for family members, or for other reasons cannot attend college classes in person at the times they are offered.

An increasing variety of online course offerings are available to Virginians through private and career colleges. Liberty University, for example, has been a pioneer in online learning. In the 2009-2010 academic year, Liberty enrolled 53,000 students in online courses and it projects reaching 60,000 students this academic year. At least 18 for-profit colleges and other organizations certified by SCHEV provide online programming in the state. As noted previously, leaders of several public universities in Virginia have expressed interest in collaborating to provide instructional content that could support online degree programs in several basic areas of study. Yet, the adequacy of online course offerings compared to the current and potential demand is unclear.

The Commission recommends that the Commonwealth undertake a comprehensive assessment of the availability and affordability of online courses, determine the potential demand for online instruction (among “returning” college-goers, military personnel and veterans, and other non-traditional students), and explore avenues for greater collaboration between online course providers and existing public and private undergraduate programs in the state. Virginia needs an achievable plan for maximizing the opportunities for college completion and degree attainment by non-traditional students through online programming.

A fourth area where technology can enhance instruction is the use of electronic textbooks and other online curriculum. Even in the short time since Governor McDonnell called attention to these opportunities—and their positive impact on college affordability—during the gubernatorial campaign, the development of new technologies and their use on college campuses has expanded rapidly. The pilot project partnership between Amazon.com and the Darden School of Business at the University of Virginia for educational use of the “Kindle” is an encouraging example. Another notable example is at the School of Business at Virginia State University (VSU), where students will need nothing more than a computer, an iPad, an e-bookreader, or a mobile phone to gain access to the courses in their core curriculum and all the required texts. VSU’s School of Business has created an online portal through which the content for nine integrated core courses can be digitally delivered, and where the textbooks are available for free download. This digital delivery mechanism is designed to increase access and affordability to the student. The Commission believes that ongoing technological innovation, the imperative of cost control, and student facility with electronically conveyed information will combine to produce rapid movement toward electronic texts and course materials in the years ahead. While the Commission does not believe a state-level initiative is necessary to encourage this trend, institutions should be alert to opportunities to facilitate the transition.

Degree Path Initiatives. The third major area of reform-based investment advocated by the Commission is the development of more innovative and economical degree paths. The goal is to decrease the cost and reduce obstacles to timely degree completion for Virginia students while maintaining and enhancing academic quality. The strategies recommended here address early college credit opportunities, the community college transfer program, expedited degree options, and developmental (i.e., remedial) initiatives to increase the percentage of college-ready graduates from Virginia’s secondary schools.

The Commission believes that opportunities for Virginia teens to earn economical college credits and/or advanced-placement status during high school should be encouraged, expanded, and enhanced. The means exist in some locales for students to complete simultaneously the work required for an associate degree and high school diploma, and programs of this kind should be expanded to more high schools throughout the Commonwealth. At the same time, the rapid increase in the number of high school students taking dual-enrollment courses makes it important that steps are taken to ensure uniformity of quality and outcomes that do not impede academic success once in college. The success of dual enrollment, particularly for low-income and minority students, in the Halifax County Public School System can serve as a model for scaling up opportunities in other school divisions.

Similarly, opportunities for high school students to take AP (Advanced Placement) and IB (International Baccalaureate) courses and exams should be expanded (including via electronic delivery). Where consistent with successful student outcomes once in college, public institutions of higher education should be encouraged to accept more of these pre-college credits, to count them towards degree completion as set forth in the Commonwealth College Course Collaborative, and to promote these options. The Virginia Advanced Study Strategies, a partnership in Southside involving the Commonwealth and the National Math and Science Initiative, has yielded positive results in enrolling more students in Advanced Placement classes and can serve as a resource for efforts in other regions. Virginia's track record in this area overall is strong—only two other states, New York and Maryland, had higher percentages of seniors earning grades of 3 or better on AP tests during 2009.

Programs that combine opportunities for pre-college credits with student support services further increase the likelihood of post-secondary participation and success, especially among low-income, first-generation, and minority students. Current efforts along this line in Virginia include the community college system's Middle College and the Career Coaches program, the Pathways to the Baccalaureate Program at Northern Virginia Community College, and the Appalachian Inter-Mountain Scholars (AIMS) Program at University of Virginia-Wise. The success of these and similar programs should continue to be tracked, and where appropriate they should be supported, publicized, expanded, and replicated in order to broaden their impact.

The Commission believes the following specific steps would be beneficial in promoting additional pre-college study in the Commonwealth:

- The Commonwealth should set the objective of making opportunities for AP, IB, and dual enrollment available to all high school students across the state. As student interest exhausts capacity, the Virginia Department of Education should expand online AP course capacity to ensure that all interested and capable students can take classes either through the Virtual Virginia program or through local partnerships with online content providers, as envisioned in the virtual school programs legislation enacted earlier this year. Local school divisions

should continue to create and extend partnerships of high-school-to-college programs, such as Early College High School, College Career Academies (Halifax County), Governor's STEM academies, the Pathways to Baccalaureate program, Project Lead the Way, and the Governor's College Partnership Laboratory School Initiative, so that all regions of the state afford students enhanced opportunities for success at the post-secondary level.

- The Commonwealth should provide incentives that support K-12 schools' work to enhance student achievement, increase the number of students earning advanced studies diplomas, and better prepare graduating students for college and career pursuits. The Board of Education's Virginia Index of Performance (VIP) incentive program currently provides incentives for schools and divisions to increase the number of students who achieve at the advanced proficient level. Local school divisions should be required to release students from compulsory school attendance requirements upon completion of the state's advanced studies diploma requirements and acceptance into a post-secondary program. In addition, the Department of Education should increase its goals for the percentage of students who graduate from high school with an advanced studies diploma, the percentage enrolled in one or more AP, IB, or dual enrollment classes, and the percentage who earn at least a 3 or higher on at least one AP exam.

Beginning study in a community college is an effective strategy for reducing the cost of obtaining a four-year degree. Especially since the Commonwealth made community college transfers a clear policy priority through the Restructuring Act in 2005, Virginia and its higher education institutions have made important strides in promoting this convenient and affordable alternative. More than 7,000 students from Virginia's two-year colleges now transfer to four-year institutions each year. About two-thirds transfer prior to completing an associate degree. Obtaining a two-year degree prior to transfer tends to facilitate smoother academic transition, including acceptance of more/all credits and receipt of junior class status. In addition, all but one four-year public institution currently guarantees admission for transfer students who complete an associate degree.

The Commonwealth has provided a further financial incentive for students to follow this pathway by establishing the Two-Year College Transfer Grant program. It encourages associate degree completion before transfer by offering a \$1,000 annual award for associate degree completers who meet need-based eligibility requirements. The program awards an additional \$1,000 annually to those who transfer into programs in the high-demand fields of science, engineering, mathematics, teaching or nursing. In addition, a Uniform Certificate of General Studies currently is being developed by SCHEV, the community college system and the public four-year institutions. It will allow community college students to complete a one-year certificate and transfer all of those credits to a public senior institution.

The Commission recommends that the Two-Year Transfer Grant Program and, when developed, the Uniform Certificate of General Studies be fully funded and aggressively marketed throughout the Commonwealth. The Uniform Certificate of General Studies should also be made available to high school students who earn an associate's degree while completing high school graduate requirements. The potential of the community college transfer program to boost degree attainment, enhance affordability, and foster more STEM-related study remains insufficiently realized. Collaborative planning efforts by the Commonwealth and higher education institutions must ensure that, as more students pursue studies in community colleges and perform at a level warranting transfer to a four-year institution, space exists at those senior institutions to accommodate them. The new higher education funding model should incorporate the community college transfer grants and their full funding on a priority basis.

Students enrolling in four-year institutions also can benefit from various options that help hold down costs, expedite degree completion, or both. Several private institutions, including ECPI in Virginia, have developed successful models for undergraduate degree completion that are convenient for the student and that can be finished in less than four years. Public institutions should be encouraged to explore such models and offer options for expedited, “no frills” degree completion. Enhanced opportunities for students with proprietary degrees to transfer to public institutions also should be explored. And, as noted in the preceding section, expanded use of technology—from incorporation of technology in classroom course work to providing fully online degree options—can assist traditional and non-traditional students alike in containing costs and accessing a broader array of course and program offerings, often on an expedited basis.

A recurring problem confronting higher education in Virginia and elsewhere is the number of students who take more than four years—in some cases, considerably more—to complete their degree work. This adversely impacts both taxpayers and tuition-paying families, and the General Assembly has determined that a tuition-based incentive for timely completion is needed. In 2006, the General Assembly modified the Code of Virginia to require assessment of a surcharge for each semester that a student continues to enroll after such student has completed 125 percent of the credit hours needed to satisfy degree requirements for a specified undergraduate program.²²

The Commission agrees that creating a greater incentive for students to complete their course work on time (or within a reasonable time) is especially important given the pressing economic objectives and severe resource limitations impacting Virginia's higher education system. At the same time, the Commission is sensitive to the varied circumstances of students (some of whom need to work part-time to pay for college), to factors beyond student control (such as limited availability of needed courses), and to the demanding nature of certain degree programs for which completion time nationally is higher (including some STEM degrees). Care should be taken, therefore, in fashioning timely completion incentives so that unintended adverse impacts on degree attainment (especially in the STEM area) and affordability do not result.

²² Virginia Code § 23-7.4. Eligibility for in-state tuition charges

A particular problem facing higher education, with negative implications both for timeliness of completion and retention/graduation rates, is the widespread need for developmental (i.e., remedial) programming at the post-secondary level. In addition to providing opportunities for students to receive college credit in high school, thereby saving time and money toward a post-secondary degree, the Commonwealth must ensure that high school graduates emerge ready to pursue a successful course of study at a two- or four-year college. Remedial courses are expensive for the student, the Commonwealth, and the higher education institution involved. They postpone student advancement and often have a discouraging effect, leading a disturbingly large number of students to drop out with no credential to show for their investment of time and money. According to the community college system, just under half (45 percent) of recent high school graduates enrolled in a community college required at least one developmental education course in 2008—a percentage that has remained relatively constant over the last five years.²³

The Commission recognizes the ongoing work of the College and Career Readiness Initiative, a partnership including SCHEV, the community college system, and the Virginia Department of Education, which is endeavoring to establish college- and career-ready learning standards in reading, writing, and mathematics and to ensure that instruction in every Virginia high school classroom measures up. In order to understand fully the implications of college readiness in achieving the 100,000-degree goal and develop a concerted plan of action, the Commission recommends that a work group be created with representatives from SCHEV, the community college system, four-year public and private higher education institutions, the Department of Education, the Council on Virginia's Future, the Secretary of Education's Office, and other appropriate parties. By summer of next year this group should:

- Develop a collaborative understanding of workforce and college readiness in Virginia that relies on federal and state definitions and addresses research, policy and higher education-driven demands for a better-prepared college entrant;
- Assess current readiness assessments and remediation efforts between high school and post-secondary institutions, including the work of the community college system's Developmental Education Task Force and the College and Career Readiness Initiative;
- Identify national best program practices, early alert measures, and appropriate performance indicators; and
- Make recommendations on a comprehensive plan to phase out reliance on developmental/remedial programs at the college level by enhancing student readiness and providing necessary diagnostic and remedial attention at the secondary level.

²³ Virginia Community College Reengineering Task Force, "Making the Case for Change," <http://rethink.vccs.edu/wp-content/themes/vccsrethink/docs/CaseforChange.pdf>

Restructuring Refinements. The fourth major area of reform focus is the continued restructuring of the relationship of the Commonwealth and its public higher education institutions. All parties expressing views to the Commission on this subject have cited achievement of important progress in institutional efficiency, productivity and cost containment as a result of the Restructuring Act enacted in 2005. The benefits of the legislation vary among institutions, just as the levels of managerial autonomy and flexibility vary.

At the same time, the fiscal pressures associated with the recession have impeded realization of the Act's full potential. Actions taken to balance the state budget in some cases have disappointed expectations of the institutions. Hopes for effective collaboration between the Commonwealth and institutions on academic and financial planning have not been fully achieved. The goal of enhanced outcome measurement and less overall reporting and paperwork remains elusive. The incentive regime associated with the state's policy goals (i.e., the "state ask") appears to have little punch in practice. In short, five years into this important reform there is much to applaud and also room for improvement.

The most important ingredient for success in restructuring is the least easy to legislate. In a word, it requires *trust*. Virginia's system of higher education draws its distinctiveness and excellence from the diversity of its institutions and from the state and local educational and entrepreneurial decisions over time that have made those institutions, and the system as a whole, what they are. The decentralized approach serves Virginia well. To achieve the Commonwealth's ambitious goals for economic opportunity, reform-based investment, and affordable access in the future, however, close coordination will be required in an atmosphere of trust. The bottom line is there must be agreement on the mutual commitments that define the relationship between the Commonwealth and higher education institutions, and then those commitments must be kept to the fullest extent possible. Perhaps nothing is more dispiriting than to go through the arduous process of crafting new approaches and understandings only to have them change with the perspective of the next administration, the vagaries of the legislative process, or the prevailing winds on campus. Continued restructuring must be built on a firm foundation of mutual confidence.

The Commission's recommendations for refinement to the restructuring process and legislation are three-fold:

- An effective collaborative and consultative process must be established for the development, refinement and endorsement of institutional performance plans with appropriate participation by executive, legislative and institutional representatives.
- Performance metrics and corresponding incentives should be streamlined and more robust, tailored to specific outcomes on state policy priorities, and more focused on economic impact and innovation.

- A working group comprised of institutional and state-level representatives should be tasked with identifying additional opportunities for cost-saving or productivity-enhancing reforms in the relationship of Commonwealth and its higher education institutions.

Effective planning is the key to the success of strategic initiatives and to operational efficiency. In Virginia's system of higher education, effective planning depends on collaboration and consultation primarily between and among the institutional administrators, executive branch officials and agencies, and legislative money committees. Given the distinctive constitutional and statutory roles of each, the process must be informal and flexible, providing opportunities to present plans, proposals and funding requests, receive timely feedback, and forge a consensus path forward to the greatest extent possible. It must be a candid and transparent process and occur in a timeframe that makes it relevant and useful in the executive budget development and legislative appropriations processes.

There are numerous models for such a collaborative process already in Virginia, including the approach taken in capital outlay pursuant to the 2008 legislation, the determination of peer institutions for faculty compensation purposes, the setting of institution-specific enrollment and graduation targets, and others. To the extent possible, such planning processes for each institution should be integrated and consolidated so that interrelated academic, financial, and operational matters are addressed in a coordinated manner. Whether the output is characterized as an agreement, a plan, or some other term that embodies consensus, the important thing is that it reflects the considered input and buy-in of the key players identified above. The Commission views achieving this objective as a lynchpin for success of the initiatives proposed in this report.

A second area of refinement needed in restructuring relates to performance metrics and incentives. Currently, colleges and universities must set targets and report progress with respect to the "state ask" embodied in the Act's "Institutional Performance Standards." Benefits in certain areas prescribed by statute inure to those institutions that earn a passing grade. While the benefits are important to the institutions, most of the comment received by the Commission suggests the pooled incentive approach, with its pass-fail aspect, has little discernible impact on performance. The all-or-nothing approach results in the setting of more modest goals than actually may be achievable since, as a practical matter, failure is not an option.

In addition to remedying these shortcomings in the current regime, the Commission believes that more far-reaching changes are needed as part of the "Top Jobs" legislative initiative. As discussed in an earlier section of this report, performance metrics should focus to a greater extent on outcomes relating directly to economic opportunity and impact. Institutional managers, state-level decision-makers, and—perhaps most important—tuition-paying students and parents all should be armed with information about the earnings potential and value in the job market of particular degrees from particular institutions. Improvement according to such economically salient metrics

should be among the top performance objectives for individual colleges and universities and for the system as a whole.

The objectives of better outcome-focused performance metrics and a more effective and robust performance-based funding system are closely connected. Throughout this report we offer specific recommendations for initiative and improvement in the areas of economic opportunity, reform and innovation, and affordable access. For the most part, our recommended approach does not involve mandating these changes, but rather calls for creating incentives to which the institutions can respond entrepreneurially based on their distinctive missions, situations, and opportunities. For this approach to work, however, the incentives must be a material component of the funding model and must be tied directly to specific performance objectives. The modest, pooled incentives currently in the Restructuring Act seemingly fail both of these tests.

As we discuss more fully in the later section of this report describing the Commission's funding model recommendations, performance-based funding should be connected to each of the Commonwealth's major policy priorities, including increased enrollment of Virginia students, increased degree completion by returning students, improved graduation rates, STEM degree production, research investment, year-round utilization of resources, technology-enhanced instruction and resource-sharing, the creation of innovative and affordable degree paths, and so forth.

A third area of restructuring refinements—one requiring ongoing attention—is the effort to eliminate obstacles to efficient management that may still inhere in the regulatory and reporting relationship between the Commonwealth and its higher education institutions. The Commission has received anecdotal information regarding opportunities for additional cost-saving and/or productivity-enhancing changes. The efficacy of such ideas generally cannot be explored without better dialogue between the institutions and responsible officials and agencies at the state level. One model for such dialogue may be Virginia's public-private partnership laws for infrastructure development. Since the adoption of the more wide-ranging statute in 2002, a working group consisting of executive and legislative branch officials and knowledgeable members of the business and professional community has met each year to take stock of how the program is functioning, implement legislated changes, and suggest refinements in state laws and implementing guidelines to improve its operation. A similar approach could help achieve additional benefits in higher education restructuring.

Community College “Reengineering.” Facing unprecedented double-digit enrollment increases and significant general fund support decreases, the Virginia Community College System embarked on a reform initiative of its own in November 2009. It created the “Reengineering Task Force” to critically examine and rethink every aspect of the system's organization and operations so as to support its strategic plan (*Achieve 2015*) goals focused on access, affordability, student success, workforce, and raising private resources.

Pervasive throughout the deliberations of the Task Force were three themes: the need to reinvest in VCCS's people as the centerpiece for accomplishing the system's strategic goals; the need to leverage the power of technology to improve productivity; and the need to provide personnel with tools and training that will enable them to manage "with productivity in mind" as a matter of course in everyday activities. Equally important were discussions about the lessons learned from colleges participating in "Achieving the Dream" initiatives—especially the lesson that fostering effective change requires data-driven decision making within a culture of evidence.²⁴ After a year of intensive meetings, debate, emails, feedback from various groups, and town hall meetings held by the Chancellor, ten "Big Ideas" emerged from the Task Force's work.

The Commission has followed the "Reengineering" process closely and applauds the effort. Many of the Task Force's "Big Ideas" and corresponding recommendations coincide and resonate with the goals and interim recommendations outlined in this report. The Task Force's work is ongoing, as is this Commission's, and we anticipate continuing collaboration.

The Commission recommends that the Commonwealth support the "Reengineering" process and its reform and innovation efforts focused in the following ten key areas: (1) to redesign developmental education; (2) to implement Shared Services (e.g., centralizing "Back Office" functions such as financial aid; leveraging VCCS purchasing capacity; piloting shared distance learning services; expanding opportunities for development of consortia); (3) to strengthen and diversify the VCCS resource base; (4) to articulate course/program learning outcomes to enhance student success; (5) to foster a culture of high performance; (6) to automate student success solutions and develop public-private partnerships for student success; (7) to expand the teaching employment spectrum; (8) to conduct credit audit of academic programs; (9) to reposition Workforce Services as a high-performance operation to meet employer needs and contribute to the financial strength of the VCCS; and (10) to continue Reengineering efforts.

²⁴ Virginia Community College Reengineering Task Force, "Making the Case for Change," <http://rethink.vccs.edu/wp-content/themes/vccsrethink/docs/CaseforChange.pdf>

(3) Affordable Access

The Commission believes Virginia must renew its longstanding commitment to affordable access to a college education for every capable and determined Virginian. College is not right for everyone, but it is right for many more Virginians than are now obtaining degrees, and that is the gap that must be addressed.

It was Thomas Jefferson—the product of one of our Virginia universities and founder of another—who articulated the distinctively American vision of education’s central role in a free society. He spoke of a “natural aristocracy” based on merit, with education as the means to enlightened citizenship and economic opportunity *for all*, not just a privileged few. Virginia has made that vision a reality by developing a public-private system of higher education whose hallmarks are excellence, diversity and access.

Access, however, depends on affordability. While the Virginia Constitution guarantees citizens a free public education, that assurance has never included post-secondary study. College-going students and their parents have always been expected to pay part of the tab, assuming they are financially able. Striking the appropriate balance between the contributions of state taxpayers and tuition-paying students and parents is the recurring challenge. And with the vast majority of Virginians now believing that a college degree rather than a high school diploma is the educational credential required for economic success, it is perhaps time to consider updating the state Constitution to embrace the principle of affordable college access.

As state resources allocated to higher education have declined sharply during the severe recession, the burden of financing college-level study has shifted decisively to students and their families. This trend, while pronounced in Virginia, is not limited to this state. The federal government has implemented a two-pronged response—providing so-called “stimulus” funding to the states in the hope of maintaining government support for higher education while catalyzing economic growth, and assuming direct responsibility for administering student loan programs. The former will run its course in 2012, and the disappearance of “stimulus” dollars will create a funding cliff that institutions across the country will have to offset in large part through further tuition and fee increases. The latter measure—replacement of federal guarantees with direct student loan funding and administration—was enacted earlier this year, and its effects are unknown.

In the face of this daunting and uncertain future for those seeking to attend college, the Commission has considered various affordability strategies. In a broad sense, the reform and innovation described in the preceding section bears on affordability, since our recommendations all seek in one way or another to contain costs and deliver greater value. Year-round utilization of resources, applications of new technology in instruction, development of innovative and affordable degree paths, and further restructuring reforms will assist in holding the line on college costs while helping to preserve and enhance educational quality. A system that is already lean and efficient will perform even better if our recommendations are adopted.

More is needed, however. Virginia must couple these cost-saving and value-enhancing innovations with changes in state funding policies that put the Commonwealth on a sure path toward higher educational attainment and the personal income growth that accompanies it. As we have already acknowledged, there is no prospect of a big infusion of additional state resources or a quick recovery of lost funding. Instead, as we contemplate a future beyond the near-term funding cliff and its tuition impact, the Commonwealth should make a commitment to long-term policies that will reduce reliance on tuition in funding the Virginia higher education system and keep college within reach for low- and middle-income families. Our Commission has a four-part recommendation with respect to that long-term policy change:

- First, the Commonwealth should craft and codify a funding model that embodies its commitment to sustained investment in higher education, with the corresponding effect of relieving the upward pressure on tuition over time.
- Second, the Commonwealth should provide an incentive for increased access by promising to every capable Virginia student that a significant increment of state resources will follow the student to the public or private not-for-profit college of his or her choice.
- Third, the Commonwealth should invest more in student financial assistance—in the form of direct aid and low-interest/forgivable loans—to ensure that college remains affordable for middle-income families as well as for the low-income families that traditionally have received aid.
- Fourth, as growth revenues rebound, the Commonwealth should set some of them aside in a rainy day fund reserved for higher education, so that colleges in the future are less subject to dramatic swings in state support and students and parents are not burdened by large and often unexpected spikes in tuition and fees.

Codified Funding Model. The central benefit of a codified funding plan is that it will embody the Commonwealth's strategic commitment to higher degree attainment and knowledge-based economic growth and help ensure that the state's actions over time match those aspirations. A parallel benefit is that it will enhance affordability by reducing reliance on tuition over time.

To achieve these objectives, the model must be understandable, and the funding it provides must be as predictable and reliable as possible. One of the biggest obstacles to cost-efficient management of colleges and universities—and to the systematic pursuit of innovation and reform at those institutions—is the impediment to strategic planning and execution posed by gyrations in government policy and funding. A related impediment, at least in Virginia, is the lack of an effective mechanism by which institutional leaders and state policymakers can come together to fashion agreement on key initiatives. A

well-conceived state policy, plan and corresponding funding model for higher education can build on methodologies and innovations that have contributed to the system's success to date, establish protocols for effective policy collaboration going forward, and provide incentives for improvement in the priority areas outlined elsewhere in this report (economic opportunity, reform-based investment, and affordable access).

We take as a given that such a new funding model will not be “fully funded” initially. There is nothing to be gained from premising a model on current per-student funding levels that are worth barely half of what they were just a decade ago, that over-burden students and their families, and that does not reflect or contemplate the level of investment necessary to achieve the state's ambitious goals for educational attainment and personal income growth. Instead, the funding model should serve as a roadmap for improvement and a magnet for investment as revenues gradually rebound. As Governor McDonnell has observed and we noted earlier in this report, even a relatively modest change in state spending priorities, if consistently maintained over time, can have a dramatic impact on the level of investment in higher education. The course must be set so that incremental progress actually follows.

As a conceptual framework for the funding model, the Commission recommends four main categories, or building blocks, that capitalize on existing strengths and incorporate the various initiatives recommended in this report. They are:

1. Basic Operations and Instruction
2. The Virginia Promise (Per-Student Funding)
3. Need-Based Financial Aid
4. Incentives for Economic Impact and Innovation

While the enrolling college or university is the funding recipient regardless of the category, two of the four categories (first and fourth) would be calculated based on the institutions' operations, programs, and initiatives. The other two categories (second and third) would follow the student based on factors specific to the individual, such as where he or she applies and gains admission, where he or she chooses to enroll, and what his or her financial needs are. Because the funding in the second and third categories follows the student, the policies applicable to those building blocks have implications for both the public institutions and the independent (not-for-profit) colleges in the Commonwealth.

Basic Operations and Instruction. In developing a consistent, reliable approach for funding the public institutions' basic operations and instruction, the Commission believes the proper starting point is the “base budget adequacy” (BBA) model developed initially in 2000 pursuant to the work of the Virginia General Assembly's Joint Subcommittee on Funding Policies (“Chichester Commission”) and used for limited purposes during the past decade. Primarily a peer-based cost reimbursement model, the BBA regime was fashioned through a collaborative approach that included experienced finance officers from several of the public colleges and universities, staff of the legislative money committees, SCHEV representatives, and others. The model's salient feature is a set of formulas for calculating instructional cost on faculty-student ratios for different

disciplines. It also calculates funding needs for non-faculty academic support, student services, and operation and maintenance and physical plant.

Although the BBA model has not been updated since its adoption more than a decade ago, the Virginia Business Higher Education Council commissioned an independent study by NCHEMS to review and largely validated its accuracy.²⁵ NCHEMS identified several deficiencies or issues that should be addressed in updating the model, the most consequential of which is the organization's finding that the model chronically tends to understate the appropriate level of funding for the community college system. NCHEMS also noted that the trend in other states is away from a pure cost-reimbursement model like BBA and toward making a portion of higher education funding performance-based. Our recommendations likewise call for a significant set of performance incentives as a fourth component of the overall funding model, a topic on which we elaborate below.

The Commission believes that the Cost of Education concept first advanced in the early dialogue leading to the 2005 Restructuring Act should be incorporated into the base funding component of the new Virginia model. Using an updated version of the BBA methodology, an appropriate level of funding for instructional and operational costs ("Cost of Education") should be calculated for each institution. As in the earlier consultations leading to the BBA model, this should be a collaborative process that reflects input and buy-in by the institutions and appropriate executive and legislative branch officials.

In crafting the model, the BBA methodology should be followed to the extent feasible consistent with established state policies and institutional practices here in Virginia. Certain longstanding policies, such as the Commonwealth's commitment to its historically black colleges and universities, its support for the adversative military-style pedagogy at VMI, and its commitment to having a distinctive "public ivy" at William and Mary, among others, will necessitate adjustments in arriving at the "Cost of Education" figure for those institutions. Consideration should also be given to the value of medical and other graduate degree programs that traditionally have not covered their full cost and have necessitated subsidy through other graduate and undergraduate programs. Additional grounds for adjustment may well be warranted based on policy and practice. At the end of the process, the methodology for calculating each institution's basic Cost of Education would be set. The calculations could be re-run annually (or less often if state policymakers see fit), but the model itself would need to be updated only periodically, perhaps every five or seven years.

Several important benefits would accrue from establishing the Cost of Education for each institution and employing it consistently in state funding allocations. First, it would enhance funding predictability and reliability, thereby aiding planning and efficient management. Second, it would make base funding allocations more objective and minimize the influence of ad hoc considerations, such as lobbying. Third, as state

²⁵ "Assessment of the Base Adequacy Funding Model, National Center for Higher Education Management Systems and Delta Project on Postsecondary Education costs, productivity and Accountability, October 12, 2010

funding for higher education rebounds with the economy, discrepancies among institutions could be remedied so that each institution makes progress toward “full funding” at the same rate as the system as a whole, enhancing fairness. And, as state support progresses incrementally toward “full funding,” the Cost of Education would supply an upper limit on tuition increases, enhancing affordability.

Current state policy for the public higher education system calls for the Commonwealth to pay two-thirds of the cost of educating Virginia students and for the institutions to cover the other third through non-general funds (i.e., mainly tuition and mandatory fees). This policy has been honored more in the breach than the observance, however. On average the Commonwealth today pays less than 50 percent of this cost today, and the rest is borne mostly by tuition-paying students and families. The Commonwealth should determine what the appropriate share of this cost burden is for tax- and tuition-payers going forward, and set the funding model accordingly. An aspirational funding split that is so far from present or achievable reality as to make it irrelevant not only lacks value in the planning and funding process; it fosters a detrimental cynicism. Whether state policy continues to envision a 67-33 percent split or is set at a different level is a decision for the Commonwealth’s policymakers, who must weigh a range of competing goals and needs. The more the Commonwealth is able to cover, the less the burden will fall on tuition-paying families. What matters most for the future is that the Commonwealth’s funding actions over time actually match its declared policy goals embodied in the model to the fullest extent possible.

Once the basic Cost of Education for each institution is fixed and the Commonwealth’s contribution toward meeting that cost is determined, the balance of funding will ordinarily come from non-general funds generated by tuition and fee charges. Absent initiatives approved by the institutions’ governing boards and endorsed at the state level, tuition should not exceed the amount necessary to close this gap. That way, as the Commonwealth makes progress toward funding its full share of college costs for Virginia students, there will be a corresponding easing of tuition pressures on students and their families. Certain tuition-funded costs generally will be outside this sliding-scale formula, such as the institution’s required contribution to state-mandated pay raises, its local match of state-incentivized initiatives, and financial aid payments not funded by the Commonwealth.

The proposed funding model thus will provide significant leverage for greater college affordability—leverage, that is, to the extent the Commonwealth succeeds in funding its share of the total Cost of Education. The Commission believes it is imperative that the actual authority for setting tuition and fees remain with the institutions, as it is under current law. Nevertheless, the incentives—financial and otherwise—for keeping tuition within the bounds of the model will be significant. The means for making well-considered and justified departures from the model also will exist:

- In the event an institution conceives a new initiative of value to the Commonwealth that it proposes to fund in whole or in part by raising non-general funds beyond the level envisioned in the funding model,

the planning process recommended in the preceding section on restructuring will provide an effective vehicle for state-level endorsement, acquiescence, or discouragement.

- In the event an institution with the requisite market power chooses to restructure its pricing and generate additional revenue by increasing the effective tuition cost for those at higher income levels while protecting middle- and low-income students through increased financial aid, that same planning process will afford a mechanism for determining any corresponding change in the level of state support or other conditions.
- And, in the unlikely event that a public college or university proceeds, outside the bounds of both the funding model and the planning process, to increase tuition to levels deemed unacceptable at the state level, legislative and executive branch decision-makers have ample means through the appropriations process to impose consequences.

Also important as an element of each institution's basic instructional funding is the Commonwealth's policy on faculty salaries. Instructional quality is the central element in the college value equation, and vigorous competition for talented faculty is a facet of the higher education landscape that comes into play in virtually every aspect of this initiative, from generating a high economic return by equipping Virginians for top knowledge-based jobs, to enhancing our national and international competitiveness through much higher STEM degree production, to generating leading-edge business investment and job creation through lucrative university-based research. The Commission believes the Commonwealth's declared but unattained objective of providing average faculty compensation at the 60th percentile, or somewhat above average of designated peer institutions is a sound policy and should be embedded in the funding model.

While performance-based funding is addressed below and reflects the Commission's emphasis on providing incentives for innovation and reform rather than imposing new mandates on the institutions, certain actions are so central to the Commonwealth's interest as to be expected from each institution. Failure to comply with state policy in such areas should have some impact on funding of basic instruction and operations. In addition to existing expectations related to legal compliance and financial stewardship, the Commission believes three areas of initiative fall in this category:

- The achievement of targets for conferral of degrees on Virginia students;
- The development of plans for optimal year-round utilization of facilities and resources; and
- The development of plans for instructional-resource sharing across the higher education system.

The Virginia Promise (Per-Student Funding). Turning to the second building block in the four-block funding model, the Commission’s proposal to have an increment of state funding follow the student to the public or private (not-for-profit) institution of his or her choice has a two-fold rationale and benefit. First, it would allow student choices and demand to drive institutional funding levels, at least on an incremental and interim basis, and thus provide an incentive for institutions to enroll more students—a key element in achieving the overarching goal of having more Virginians earn college degrees. Second, the fact that it embodies a commitment to every Virginia student would increase the likelihood that its future funding survives the vagaries of the business cycle and political winds, thereby helping to keep the Commonwealth on track toward its long-term educational attainment goal.

As a starting point, the Commission recommends that the “Virginia Promise” be set at the current level of the Virginia Tuition Assistance Grant (TAG) program, approximately \$2,600—or, if TAG grant funding is restored and enhanced, as we recommend, then at that higher level. Except to the extent of such a TAG increase, no new funding would be provided initially. Rather, the “Virginia Promise” would be funded as part of the public institutions’ existing base funding or, in the case of private colleges, through their existing TAG funding. Over time, however, economic substance would be added to the Virginia Promise’s symbolic value, since institutional funding would grow with the enrollment of more Virginia students. Of course, funding already generally follows enrollment growth at independent colleges under the TAG program, and under the base funding approach outlined above public institutions would see their funding rise with enrollments whenever the base is recalculated. In the interim between such recalculations, the Virginia Promise payments would provide an incremental increase in per-student support.

Need-Based Financial Aid. The funding model’s third major component is need-based financial aid. In contrast to the Virginia Promise, which applies to every Virginia student and is a portion of the enrolling institution’s base funding, student financial assistance is based on need and helps defray the eligible student’s tuition and fee charges. Currently, the Commonwealth funds a portion of need-based financial aid and the balance is funded by the institutions. While need-based financial aid is an essential tool in addressing affordability, it has limitations. Commission members have expressed concern about increased reliance on higher tuition charges for some students as a source of funding for financial aid to others. The Commonwealth needs to do more.

The Commission has focused on the particular affordability challenge faced by middle-income students and their families. Wealthy Virginians generally can afford to pay for college, and they even get a subsidy from taxpayers: those attending independent colleges qualify for TAG payments, and at public institutions in-state tuition is substantially lower than the actual cost to educate the student. At the low-income end of the spectrum, needy Virginians traditionally have qualified for ample federal grants and/or loans. In the middle, however, families are squeezed because tuition continues to rise yet financial aid through grants is limited or nonexistent.

The Commission recommends that the Commonwealth undertake a systematic assessment of financial aid eligibility and practices at its institutions of higher education, including the impact of recent policy changes at the federal level, with the objective of enhancing financial aid eligibility and awards for middle-income families without diminishing need-based aid for low-income families. Consideration should be given to providing increased grants and exploring the feasibility of guaranteed loan options for middle-income tuition-payers as means of filling identified gaps in existing aid programs.

To avoid merely adding to the student debt burden, any guaranteed loan program at the state level either should provide a lower-interest alternative to federal loan programs or should be convertible into a grant based on performance of certain conditions. Such forgivable loan options may have value in achieving important state policy goals. For example, a loan might be forgiven in whole or in part if a student completes a STEM degree program and then teaches STEM-related courses in elementary or high school for a specified period of time.

While the recent federal changes in student financial assistance programs have altered the landscape significantly, necessitating more extensive study than the Commission has been able to accomplish to date, it is important that the forthcoming “Top Jobs” higher education legislation express the Commonwealth’s commitment to college affordability for middle-income as well as low-income families, and set in motion a process leading to viable student financial aid solutions that are incorporated in the codified higher education funding model.

Incentives for Economic Impact and Innovation. Earlier in this report we noted the salutary trend across the country toward a more performance-based approach to higher education funding, a fact cited by the National Council of Higher Education Management Systems (NCHEMS) in its recent review of Virginia’s current higher education funding methodology. The fourth major component of our proposed funding model consists of performance incentives tied to the key policy outcomes we have recommended throughout this report. Virtually all of these recommendations relate to enhancing the economic impact of Virginia’s higher education system, introducing value-enhancing innovation and reform, or both.

Rather than a pooled incentive approach tied loosely to the achievement of a set of performance measures, the Commission recommends the development of direct and meaningful performance funding mechanisms tailored to each of the major policy initiatives proposed in this report. The incentives will take various forms, and, as with other aspects of higher education reform, the process of fashioning the criteria and corresponding funding consequences will require a collaborative legislative, executive, and institutional process. The forthcoming legislation should articulate the policy priorities and outcomes and provide for such a developmental process during 2011 so the mechanisms are in place for the next biennial budget process.

The Commission recommends development of performance-based funding elements corresponding to the following major initiatives recommended in this Interim Report, including:

- Increased enrollment of Virginia students;
- Increased degree completion by returning students;
- Improved retention and graduation rates;
- STEM degree production;
- Public-private research partnerships;
- Optimal year-round utilization of resources and other efficiency reforms;
- Technology-enhanced instruction and resource-sharing; and
- Community college transfer grants and other degree path programs

Rainy Day Fund. The Commonwealth has benefited greatly from its forward-thinking policy of setting aside a portion of growth revenues in a reserve for times of fiscal stress. This concept should be extended specifically to higher education funding, the category of state spending that has been cut first and deepest in response to each recession over the last several decades. The boom-or-bust character of higher education spending in Virginia not only has wreaked havoc with planning and reform efforts; it has made it next to impossible for parents to anticipate what it will take to put their kids through college and prepare accordingly.

As a key strategy for higher education affordability and to keep the initiatives outlined herein on track, the Commission recommends creation of an additional rainy day fund reserved for higher education. As revenues rebound over time, a portion should be set aside to help sustain higher education support in the face of future economic stresses. Perhaps most important given the demonstrated impact of our colleges and universities in creating jobs, boosting the Commonwealth's economy, and generating tax revenues, such a fund would help prevent these growth-producing investments from being slashed during the very times when they are most needed—times of economic strain.

THE COMMISSION'S NEXT STEPS

The Commission's work has been underway less than a year, and some remaining aspects of our charge will receive heightened attention in the coming months.

As noted earlier in this report, we have purposely deferred most of our work on regional strategies and public-private partnerships for business recruitment, workforce preparation, and university-based research. The Commission will focus on these important subjects in 2011, aided by the Final Report of the Governor's Commission on Economic Development and Job Creation, which was completed earlier this fall.

Another area of focus next year will be the Governor's charge to make Virginia a national leader in providing higher education opportunities to military personnel and veterans. While many of our interim recommendations encompass military personnel and veterans, we intend to give this subject particular attention in the coming months.

The Commission will actively support passage of the Governor's *Top Jobs* legislation in next year's legislative session. We believe this landmark legislation is an essential foundational step in committing the Commonwealth to a long-term and sustained plan that will lead to significantly higher college degree attainment, greater personal economic opportunity, and unsurpassed economic growth and competitiveness for our state. We expect this initiative and legislation to received broad bipartisan support in the General Assembly, fueled in part by an intense belief in the business and professional community that this action is urgently needed for success in the knowledge economy. All Virginians have a stake in the enactment of this strategic vision for reform, innovation, and investment.

As we noted at the outset, passage of the legislation will not complete the planning process. But it is a vital first step, because it will set the direction, provide a framework, and commence a collaborative process for the full development of the funding model, key incentive components of the plan, and other provisions. Work likewise will continue on STEM degree production strategies, opportunities to capitalize on new technologies, course redesign and instructional resource-sharing, restructuring and Reengineering reforms, and other key initiatives referenced in our interim recommendations. The Commission expects to be actively involved in many of these discussions.

We conclude this phase of our work with an appeal to all Virginians who love our Commonwealth and believe in its potential for continued greatness. These times continue to challenge us all, but they also serve to clarify our choices and focus our vision. As Governor McDonnell said in his inaugural address, "The creation of and desire for opportunity has shaped Virginia from its very foundation. It is why even in these tough times we will have the foresight to invest today in ideas and economic policies that increase economic prosperity tomorrow." It is in that spirit that we offer these interim recommendations and urge enactment of legislation affirming the Commonwealth's resolve to prepare Virginians for the top jobs of the 21st century.

Attachment A - Executive Order No. 9 (revised July 9, 2010)

Establishing the: "Governor's Commission on Higher Education Reform, Innovation and Investment"

Importance of the Issue

The current period of economic challenge facing our Commonwealth and Nation comes during an era of rapid technological advancement and intensifying international competition, requiring an increasingly knowledgeable workforce and engaged citizenry. There is a well-documented general correlation between the degree or certificate a person gains and the income he or she earns-between a state's educational attainment and its per capita income. Higher education is among the state programs generating the highest return in terms of job creation, economic growth, and ultimately tax revenues.

With great national universities, a higher education system distinguished by both its quality and diversity, and a vibrant knowledge-based economy, Virginia has a unique opportunity to show the way to a new era of American leadership in advanced education, ground-breaking research, and economic growth. Our country's security, our state's prosperity, and our citizens' opportunity all depend on a sustained commitment to higher education excellence and access.

During the first decade of this century, Virginia's state support for public colleges and universities was cut nearly in half on a per-student, constant-dollar basis. The result was an unprecedented cost shift to students and their families and a potential threat to quality and access. Tuition has nearly doubled in the past decade. Colleges and universities must continue to find ways to reduce operating costs and focus on the disciplines that lead to the high paying jobs of the future. Greater efficiencies and more productivity in the state system must be found.

There is a pressing need for the Commonwealth to establish a long-term policy of reform, innovation and investment that will ensure instructional excellence, create affordable pathways to college degree attainment for many thousands more Virginians, prepare our citizens for employment in the high-income, high-demand fields of the new economy, foster socio-economically important research and development, and ensure affordable access to appropriate post-secondary education, training, and re-training for all Virginians.

Governor's Commission on Higher Education Reform, Innovation and Investment

Accordingly, by virtue of the authority vested in me as Governor under Article V of the Constitution of Virginia and under the laws of the Commonwealth, including but not limited to Section 2.2-134 of the *Code of Virginia*, and subject always to my continuing and ultimate authority and responsibility to act in such matters, I hereby establish the Governor's Commission on Higher Education Reform, Innovation and Investment ("Commission").

The Commission shall consist of up to 30 members appointed by the Governor and serving at his pleasure. The Governor shall designate a Chairman and one or more Vice-Chairmen from among the members. The Commission shall include the Secretary of Education, the Secretary of Technology, the Secretary of Finance or designate, and the Vice-Chairman of the Council on Virginia's Future and other state leaders as determined by the Governor. The Lieutenant Governor, Secretary of Commerce and Trade, and Senior Economic Advisor shall serve as *ex officio* members.

The Commission shall consider the current state of public and private higher education in Virginia and the best practices in other states and countries, and shall make findings and recommendations for addressing the following priorities:

- Preserving and enhancing the instructional excellence of Virginia's leading universities and of the higher education system as a whole;
- Increasing significantly the percentage of college-age Virginians enrolling in institutions of higher education and attaining degrees;
- Attracting and preparing young people for the STEM (science, technology, engineering, and math) areas and other disciplines (e.g., healthcare and advanced manufacturing) where skill shortages now exist and/or unmet demand is anticipated;
- Forging new effective public-private partnerships and regional strategies for business recruitment, workforce preparation, and university-based research;
- Making Virginia a national leader in providing higher education opportunities to military personnel and veterans;
- Crafting a sustainable higher education funding model that will systematically move Virginia toward higher levels of educational attainment and economic competitiveness over the next decade-and-a-half;
- Developing innovative ways to deliver quality instruction, cost-saving reform strategies, and affordable new pathways to degree attainment for capable and motivated Virginians regardless of income or background;
- Evaluating strategies to reduce costs through additional college placement testing and accelerated degree completion; and
- Creating effective workforce development programs through expanded use of the Community College System in coordination with the Commission on Economic Development and Job Creation.

The Commission's report shall set forth a comprehensive strategy for increased educational attainment, skills development, and lifelong learning that will equip Virginians to succeed at the highest levels of global economic competition. The strategy shall include a renewed commitment to public-private collaboration, predictable state operational support, and managerial flexibility at the institutional level. The strategy shall simultaneously challenge, encourage, and empower the institutions to attract resources, emphasize STEM and other priority disciplines, while deemphasizing low-demand programs, and using new technology and pedagogy to replace outmoded methods of service delivery with cost-effective instructional programming. The strategy shall embrace the full array of Virginia's higher education assets-public and private, for-

profit and not-for-profit, residential and non-residential, physical and virtual-for the purpose of ensuring that all Virginians have affordable access to appropriate post-secondary education, training, and re-training opportunities.

The Commission shall accomplish its work through committees appointed by the Chairman and corresponding to the following three major objectives, together with such additional committees, subcommittees and working groups as the Chairman may establish:

(1) Increased Degree Attainment, Financial Aid and Workforce Training

- Plan for achieving the goal of 100,000 cumulative additional associate and bachelor's degrees over the next 15 years;
- Concentration of increased educational attainment in the STEM areas and other high-demand and high-income fields;
- Plan to support increased enrollment of Virginia students;
- Suitable financial aid for low and middle income families;
- Alignment of policies, resources and incentives to promote study in areas where shortages of skilled workers exist or are anticipated;
- Provision of enhanced higher education opportunities to military personnel and veterans; and
- Coordination with the Job Creation Officer, Office of Commerce and Trade, and Governor's Economic Development and Job Creation Commission on workforce development initiatives and recommendations.

(2) Implement Innovation and Cost Containment

- Model for higher education funding and service delivery that embodies a long-term commitment to high-quality instruction and affordable access, and that incorporates the degree attainment goals set out in (1) above;
- Rigorous cost-benefit analysis to identify and phase out low-demand programs and reduce/prevent wasteful central office administrative spending and eliminate redundancy within and across higher educational institutions;
- Optimal development and utilization of private and federal resources;
- Increased collaboration among high schools, community colleges, four-year institutions, and private providers to reduce the time and cost of obtaining a college degree;
- Use of new technology for delivering instruction, including course re-design for online learning, use of electronic instructional materials in lieu of textbooks, etc.; and
- Analysis of the principles and objectives of the Higher Education Restructuring Act of 2005, and enhancements thereto.

(3) Regional Strategies/Partnerships for Research and Economic Development

- Plan to dramatically increase the leveraging of private and federal research funding by Virginia's colleges and universities;
- Coordination with development of a Virginia Energy Institute and other energy-related research initiatives;
- Coordination with the Office of Commerce and Trade to develop region-specific strategies and partnerships through which public and private colleges and community colleges participate actively in economic development, workforce training, development of research parks, and related activities; and
- Identification of funding streams through which financial incentives for regional collaboration and public-private partnerships may be introduced.

The Commission shall submit to the Governor its interim findings and recommendations on matters potentially impacting the development of the Executive Budget no later than September 30, 2010. The Commission shall submit to the Governor an interim report of its activities, findings and recommendations no later than November 30, 2010. The interim report shall focus primarily on increasing degree attainment, concentrating increased educational attainment in STEM areas and other high-demand and high-income fields, a model for higher education funding, and partnerships through which public and private colleges and community colleges participate actively in economic development and workforce training. The Commission shall continue to meet and make recommendations on additional stated objectives throughout calendar year 2011.

Staff support as necessary for the conduct of the Commission's work during the term of its existence shall be provided by the Office of the Governor, the Office of the Secretary of Education, the Offices of the other Governor's Secretaries represented on the Commission, the Department of Planning and Budget, the Council on Virginia's Future, and such other agencies as the Governor may designate. All executive branch agencies shall cooperate fully with the Commission and render such assistance as may be requested by it.

An estimated 2,000 hours of staff time will be required to support the Commission. Such funding as is necessary for the term of the Commission's existence shall be provided from sources, including both private and appropriated funds, contributed or appropriated for purposes related to the work of the Commission, as authorized by Section 2.2-135(B) of the *Code of Virginia*. Direct expenditures for the Commission's work are estimated to be \$15,000, exclusive of staff support.

Effective Date of the Executive Order

This Executive Order shall be effective upon its signing and shall remain in full force and effect until March 26, 2011 unless amended or rescinded by further executive order.

Given under my hand and under the Seal of the Commonwealth of Virginia this 26th day of March, 20

Attachment B - Degree Attainment, Financial Aid and Workforce Training Committee Interim Report

Committee Background

The Degree Attainment, Financial Aid and Workforce Training Committee is chaired by Bill Barr and co-chaired by Leslie Peterson. Its members include: President John Broderick, Dr. Bill Bosher, Delegate Kirk Cox, JoAnn DiGennaro, President Mark Dreyfus, Senator Edd Houck, President Robert Lindgren, President Linwood Rose, President Carlyle Ramsey and Senator Walter Stosch.

As outlined in its charge, the Degree Attainment Committee's goals are to: (1) develop a plan for achieving the goal of 100,000 cumulative additional associates and bachelor's degrees over the next 15 years; (2) increase education attainment in the STEM areas and other high-demand and high-income fields; (3) support increased enrollment of Virginia students; (4) align policies, resources and incentives to promote study in areas where shortages of skilled workers exist or are anticipated; (5) support financial aid for low and middle income families; and (6) enhance higher education opportunities to military personnel and veterans.

During this calendar year, the Committee primarily focused on the first four goals as requested by the Policy Office. Continuing in 2011, the Committee will address the last two goals.

Committee Activity: The Degree Attainment, Financial Aid and Workforce Training Committee held two half day meetings in addition to the introductory meeting on July 12 and the joint meeting with the Innovation and Cost Containment Committee on October 12.

July 22: The first meeting was held at the UVA/VT Center in Richmond. The committee heard presentations from SCHEV staff on Virginia student demographics and enrollment and degree attainment patterns in the public institutions, including data regarding STEM degree production. The committee also received a presentation from Robert Lindgren, president of Randolph-Macon College, on the capacity of Virginia's private not-for-profit institutions to contribute to the degree production and STEM degree goals. The committee discussed the initial goal matrix and set priorities for its work.

August 31: The committee held its second meeting at Hampton University. Linda Wallinger of Virginia Department of Education ("VDOE") delivered a presentation on STEM and K-12 initiatives, both in Virginia and the nation. VDOE is participating in the Achieve American Diploma Project (ADP) to align curriculums of K-12 with the post-secondary system in addition to designing Virginia's College and Career Readiness Initiative in partnership with the SCHEV and the VCCS. The initiative is designed to (1) ensure that college-ready learning standards in reading, writing, and mathematics are emphasized in every Virginia classroom, and (2) increase students' preparation for college and the work force before leaving high school. Scores on the Science and Math

SOL's have steadily increased over the last 8 years, and on the National Assessment of Educational Progress (NAEP), Virginia students scored higher in mathematics than students nationwide in 2009. In support of improved STEM education, VDOE is also involved in teacher professional development initiatives and collaborations with the higher education and business communities.

Also at the August 31 meeting, Mark Dreyfus, ECPI President and committee member, described his institution's programs, which are developed in accordance with workforce needs and structured to expedite degree attainment. Christine Chmura of Chmura Economics & Analytics presented job demand forecasting which demonstrated that Virginia will need 100,000 additional STEM workers over the next ten years, a growth which is due to expansion in the number of STEM occupations. The presentation underscored the problem that students' lack of information about demand occupations contributes to misalignment of degrees produced by higher education and workforce needs. Students and displaced workers should have better information to identify demand occupations to enable them to make better decisions about what degrees to pursue. Industry leaders then engaged in a panel discussion moderated by Dr. Bob Leber, the Senior Advisor to the Governor for Workforce Development, regarding job demand reality. The panelists' discussion stressed that some of Virginia's most important enterprises are experiencing shortages of both high-skill (e.g., engineers) and low-skill (e.g., technicians) STEM workers.

Dr. Pinelli, the University Affairs Officer for NASA, gave a presentation on the value of STEM education and preparation, highlighting the limitations and weaknesses of the STEM pipeline. Glenn DuBois, Chancellor of the Virginia Community College System, presented the System's recent initiatives which are helping Virginians obtain credentials and jobs. Ideas that have successfully increased degree attainment for community college students are the Two-Year College Transfer Grant, Middle College, and career coaches (community college employees located in Virginia's high schools that provide individual services to students). Dr. DuBois also announced that Virginia is one of six states selected to participate in the Lumina Foundation's Project Win-Win grant, which will identify former students who fell short of an associate degree and re-enroll them to complete an associates degree. Finally, Dr. Leanna Blevins of The New College Institute made a presentation regarding the role of Higher Education Centers in increasing access and innovation in rural Virginia. The centers can contribute to the goal of 100,000 degrees by enrolling more students through technology and leveraging public-private partnerships to enhance funding and programs.

Attachment C - Innovation and Cost Containment Committee Interim Report

Committee Background

The Innovation and Cost Containment (“ICC”) Committee is chaired by Todd Stottlemeyer and co-chaired by Dr. Pam Moran. Its members include: Delegate Rosalyn Dance, Chancellor Jerry Falwell, Dr. Rachel Fowlkes, Heywood Fralin, Paul Nardo, Senator Steve Newman, Senator Tommy Norment, Delegate Beverly Sherwood, President Paul Tribble, and John “Dubby” Wynne.

As outlined in its charge, the ICC Committee’s goals are to: (1) develop a model for higher education funding and service delivery that embodies a long-term commitment to high-quality instruction and affordable access, and that incorporates the Commission’s degree attainment goals; (2) conduct a rigorous cost-benefit analysis to identify and phase out low-demand programs and reduce/prevent wasteful central office administrative spending and eliminate redundancy within and across higher educational institutions; (3) review utilization of private and federal resources and recommend enhancements; (4) identify current partnerships and strategies to strengthen collaboration among high schools, community colleges, four-year institutions, and private providers to reduce the time and cost of obtaining a college degree; (5) identify models for using new technology for delivering instruction, including course re-design for online learning, use of electronic instructional materials in lieu of textbooks; and (6) analyze the principles and objectives of the Higher Education Restructuring Act of 2005, and enhancements thereto.

Committee Activity

The ICC Committee met five times: two brief meetings following the Commission’s July 12 and October 12 meetings, the latter held jointly with the Degree Attainment Committee; and three half-day meetings at locations around the state.

July 12. Convening immediately after the Commission’s kick-off meeting, the ICC Committee spent its first meeting discussing potential meeting dates and strategies for addressing its charges/goals. The strategy that was developed centered on seeking information on examples, models, and resources that would assist members in understanding activities that were currently “working” (and could be built upon/shared/leveraged); held the potential to “work;” or were “not working.” Potential overlap with the work of the Degree Attainment Committee was noted in regard to some issues; a strict focus on the committee’s goals was urged. Prioritization and synthesis of the committee’s charges/goals were also suggested, leading Mr. Stottlemeyer to offer to draft a working outline of goals and priorities.

July 29. The Innovation and Cost Containment Committee held the first of what Chairman Stottlemeyer would later call its three “discovery meetings” at the Capitol. The agenda included presentations on: (1) the Restructuring Act (*Restructured Higher Education Financial and Administrative Operations Act of 2005*) by staff from the State Council of Higher Education (academic measures) and the Department of Planning and Budget (administrative measures); and (2) the perspectives of a public-university president (Mr. Tribble) on restructuring, productivity, and resource optimization.

Much of the discussion centered on strategies for using the goals and processes of the Restructuring Act to address productivity issues (e.g., fewer but more focused and meaningful goals; more institutional autonomy and less state “micro-management” in pursuing and achieving the goals; more significant rewards for good performance and more significant disincentives for poor performance). The fostering of an “entrepreneurial infrastructure” in higher education was suggested. Commission chair Tom Farrell suggested that more students could be served – and perhaps more could complete their degrees in less time – through more and better use of campus facilities/resources. President Tribble highlighted the importance of internships, study abroad, and other off-campus learning experiences during the summer break, as well as the need of many students to work part-time jobs to fund their education; he stressed the roles and contributions of liberal arts institutions and face-to-face interaction between students and faculty.

August 23. Another committee meeting was held at George Mason University. The agenda centered on the innovative use of technology to improve student outcomes and to reduce costs. Presenters made clear that technology can be a strategic means of hastening innovation and decision-making, of facilitating cross-cultural interaction and collaboration while reducing travel costs, and of accommodating the changing needs, demands, and learning methodologies of today’s global students (and faculty and researchers).

Under the “innovative use of technology” rubric:

- Online learning was discussed as a means to enhance student access and options and to improve student and institutional outcomes (better learning; more graduates), with participation by representatives from Western Governor’s University, University of Phoenix, and Liberty University.
- Course-redesign initiatives, such as those spearheaded by the National Center for Academic Transformation (e.g. the Math Emporium at Virginia Tech) were discussed as proven examples of strategies for improving student outcomes while serving more students, often at lower costs.
- New tools for learning, such as electronic textbooks, course management systems, collaborative tools, social media tools, and cloud computing were also discussed.

Discussion centered on the types of “organizing structures” needed to facilitate such efforts, particularly at large scales. Presenters noted that incentives often foster innovation and overcome resistance to change and that budget challenges are currently limiting technological innovation in higher education.

The committee also reviewed and discussed goals and strategies of the Virginia Community College System’s Reengineering Task Force and its connections to and overlap with the Commission’s goals. The discussion centered on issues of adequacy – adequacy of high-school-students’ readiness for college; adequacy of lower-division course availability for transfer students; adequacy of funding for the community college system to meet current and projected enrollment demand and the Commission’s degree-attainment goals; and adequacy of colleges’ and universities’ declining percentages of

full-time faculty (which one member pointed to as evidence that Virginia's public higher education system is "broken").

September 17. The third meeting took place on September 17 at the University of Virginia. The agenda centered primarily on cost containment strategies and on partnerships between PK-12 and higher education, but also included innovative STEM-related initiatives (e.g., the Pathways to the Baccalaureate program and SySTEMic Solutions at NVCC, and the Virginia Initiative for Science Teaching and Achievement at GMU).

Minnis Ridenour, Senior Fellow for Resource Development at Virginia Tech, gave a presentation on cost containment and savings strategies in higher education based on a research paper by Kathryn Webb Farley, Boris Bruk and Emily Swenson Brock, Virginia Tech graduate students, "Strategies for Achieving Productivity and Efficiencies in Higher Education." Strategies were discussed for reducing costs and increasing savings and efficiencies, with discussion of examples and best practices from across Virginia and the nation in the areas of energy management, facilities and infrastructure, business services and processes, human capital and compensation, and academic programs. Presenters recommended the use of incentives and multiple strategies, each tailored for specific types of institutions.

Examples of – and strategies for increasing/improving – opportunities for high school students in Virginia to acquire pre-college credits (such as advanced placement and dual enrollment) were also highlighted. The recent significant growth in the Commonwealth's dual enrollment opportunities was noted as a positive trend, and the successes of such efforts in rural Halifax County, particularly for minority students, were discussed. With the expanding availability of opportunities to acquire credits and to transfer them across institutions, students' ability craft programs of study to fit their interests and needs (financial, scheduling, etc.) is improving; however, when students transfer from two-year institutions to four-year institutions without first completing the associate degree – which is currently true of most transfer students, issues can arise in terms of which and how credits are counted, what status the student receives (sophomore or junior), and how many credits/semesters (and tuition dollars) will be needed to graduate.

October 12. Following the full Commission's meeting on October 12, the ICC Committee met jointly with the Degree Attainment Committee to discuss matters of potential overlap, namely PK-20 strategies for college readiness and access. The "pipeline" – the supply of college-ready students – was identified as one of the most significant issues facing the Commission and the Commonwealth. The need for a cohesive and systemic response to pipeline issues was cited as a necessary means to move beyond the current "random" distribution of successful efforts across the state. Members of the two committees debated means of addressing "readiness" within the parameters of the Commission's work (i.e., how to do so without overreaching its charge from Gov. McDonnell and its foci). The discussion continued beyond the time allotted and continued collaboration between the committees was agreed upon by the chairs.

Attachment D - Regional Strategies/Partnerships for Research and Economic Development Committee Interim Report

Committee Background

The Regional Strategies/Partnerships for Research and Economic Development Committee is chaired by Raj Narasimhan and co-chaired by Tom Loehr. Members of this committee include Jacob Downer, President William Harvey, Dr. Bob Holsworth, Delegate Scott Lingamfelter, Dr. Mirta Martin, Gil Minor, Delegate Tom Rust, President Charles Steger, Robin Sullenberger, Senator William Wampler and Charlie Whitaker.

As outlined in its charge, the Committee's goals are to: (1) plan to dramatically increase the leveraging of private and federal research funding by Virginia's colleges and universities; (2) identify funding streams through which financial incentives for regional collaboration and public-private partnerships may be introduced; (3) coordinate with the development of a Virginia Energy Institute and other energy-related research initiatives; and (4) coordinate with the Office of the Secretary of Commerce and Trade to develop region-specific strategies and partnerships through which public and private colleges and community colleges participate actively in economic development, workforce training, development of research parks, and related activities.

During this calendar year, the Committee focused on the first two goals including leveraging private and federal research dollars and financial incentives for regional collaboration as requested by the Policy Office. Continuing in 2011, the Committee will address the second two goals.

Committee Activity

The Regional Strategies/Partnership Committee met four times following its introductory briefing on July 12, during which committee members introduced themselves, reviewed their charter, and explored subsequent meeting dates.

August 2: The Committee held its first full meeting at the Capitol. Following a review of Executive Order 9 and the Committee's priorities, members received briefings on programs to stimulate academic research and tools to measure research-related outcomes. Throughout its work, the Committee wished to understand and align with, as appropriate, research-related activities and recommendations of other gubernatorial commissions. As such, Carrie Cantrell, Deputy Secretary of Commerce and Trade, reported on research-related incentives examined by the Governor's Commission on Economic Development and Job Creation.

Other important briefings included the Virginia Tobacco Indemnification and Community Revitalization Commission's \$100 million research and development investment program; the Restructuring Act of 2005, particularly addressing goals and outcomes related to economic development and externally-funded research; and research and development tax incentives at the federal level, in Virginia, and in other states.

August 16: The committee next met at Virginia Tech’s Corporate Research Center in Blacksburg. Briefings focused on leveraging R&D through federal, state, and private resources, factors impacting the innovation ecosystem and innovation, and models for regional collaboration and public private partnerships. Dr. Charles Steger, President of Virginia Tech, introduced current and potential research strengths at Virginia Tech, public-private partnerships, and challenges and potential solutions to enhancing university-based research.

Virginia Tech’s Corporate Research Center and KnowledgeWorks, a full service business acceleration center, were introduced, along with TECHLAB, a Corporate Research Center tenant and Virginia Tech spin-out. Subsequent briefings addressed intellectual property; the mission, goals, governance, and IP policy of the Commonwealth Center for Advanced Manufacturing (“CCAM”), a research facility founded by Rolls Royce, the University of Virginia, and Virginia Tech; and federal and regional research strategies.

Ann Loomis, Director of Federal Public Policy for Dominion Power, discussed challenges and opportunities in securing federal research funding, particularly through the appropriations process. She discussed the importance of partnerships that include other states and entities other than universities in order to broaden congressional appeal.

Formal presentations concluded with a briefing on the Institute of Advanced Research and Development (IALR) by Ben Davenport, board member and Chairman, First Piedmont Corporation/Davenport Energy, and by Karl Stauber, President and CEO of the Danville Regional Foundation. They discussed the importance of degree attainment and ensuring that economic benefits occur in regions of Virginia without a major research institution.

September 8: The committee held its third meeting at James Madison University in Harrisonburg; briefings and discussion focused on academic research leading to commercialization of IP, company and job creation, and R&D tax incentives. Dr. Linwood Rose, President of JMU and a member of the Higher Education Commission, welcomed the Committee.

Mark Crowell, the University of Virginia’s Executive Director and Associate Vice President for Innovation Partnerships and Commercialization, discussed the innovation ecosystem at the University of Virginia, at other U.S. universities and at Research Triangle Park (RTP). He addressed key factors in RTP’s success, including alignment of university research excellence with industry clusters, sustained state and academic commitments, and an innovation ecosystem in the university and business communities.

John Backus, Managing Partner with New Atlantic Ventures, a venture capital company based in Virginia, examined challenges and suggested solutions associated with commercializing academic R&D. Mr. Backus’ perspective was suggested by Jeannemarie Davis, Director of the Virginia Liaison Office in Washington, D.C.

Tom Weithman, Vice President Entrepreneurship and Investment Services for the Center for Innovative Technology (CIT), discussed Virginia's low level of seed and early state capital compared to peer states. He introduced CIT's GAP Funds, a family of seed-stage, near-equity convertible debt investment funds designed to transfer and commercialize IP, form companies, and create financial as well as social wealth and benefits. The GAP Funds' portfolio includes companies created from Virginia's university-based research; the program invests in technologies across the spectrum of science and technology sectors.

Pete Jobse, CIT President and CEO, spoke about the Commonwealth's comprehensive R&D strategic roadmap. The Innovation and Entrepreneurship Investment Authority has the duty of creating this roadmap, which will help guide universities in establishing research and development priorities and will include common themes and recommendations for alignment of research areas.

Paul Timmreck spoke on behalf of the Virginia Business Higher Education Council's "Grow by Degrees" campaign. He provided a historical perspective on research funding and economic development in Virginia and suggested issues that the Committee consider in order to maximize the Commonwealth's job creation and other research-related economic benefits.

October 12: In coordination with the full Commission meeting in Richmond, the committee's fourth meeting was held. At this meeting, the Chair invited discussion on priorities, concerns, and next steps. In addition, Deputy Secretary of Commerce and Trade Cantrell briefed the Committee on the Job Commission's research-related recommendations.

Attachment E - Higher Education Commission Members

Chairman – Thomas F. Farrell, II, Chairman, President and CEO, Dominion Resources, Inc. and Former Rector of the University of Virginia

Vice Chairman-Delegate Kirk Cox, Colonial Heights

Members

- William Barr, Former U.S. Attorney General
- Dr. Bill Bosher, Executive Director, Commonwealth Policy Institute and Distinguished Professor of Public Policy and Education, Virginia Commonwealth University
- John Broderick, President, Old Dominion University
- Ric Brown, Secretary of Finance
- Delegate Rosalyn Dance, Petersburg
- JoAnn DiGennaro, President, Center for Excellence in Education
- Jacob Downer, second year student at Dabney S. Lancaster Community College
- Mark Dreyfus, President and CEO, ECPI Colleges
- Jim Duffy, Secretary of Technology
- Jerry Falwell, Jr., Chancellor, Liberty University
- Heywood Fralin, CEO of Medical Facilities of America, Inc.
- Dr. Rachel Fowlkes, Executive Director, Southwest Virginia Higher Education Center
- Dr. William Harvey, President, Hampton University
- Dr. Bob Holsworth, Founder and President, Virginia Tomorrow
- Senator Edd Houck, Spotsylvania
- Dr. Robert Lindgren, President, Randolph-Macon College
- Delegate Scott Lingamfelter, Prince William
- Thomas Loehr, Executive Vice President - Crosspointe Operations, Rolls Royce
- Dr. Mirta Martin, Dean, School of Business and Professor of Management, Virginia State University
- G. Gilmer Minor, Chairman, Owens and Minor, Inc.
- Dr. Pamela Moran, Superintendent, Albemarle County Public Schools
- Raj Narasimhan, Site Director, Micron Technology Virginia
- Paul Nardo, Chief of Staff, Speaker William J. Howell
- Senator Steve Newman, Lynchburg
- Senator Tommy Norment, Williamsburg
- Leslie Peterson, Director of Operations, Chmura Economics & Analytics
- Dr. B. Carlyle Ramsey, President, Danville Community College
- Gerard Robinson, Secretary of Education
- Dr. Linwood Rose, President, James Madison University
- Delegate Tom Rust, Herndon
- Delegate Beverly Sherwood
- Dr. Charles Steger, President, Virginia Tech
- Senator Walter Stosch, Glen Allen
- Todd Stottlemeyer, Executive Vice-President, Inova Health System

- Robin Sullenberger, CEO, Shenandoah Valley Partnership
- Paul Tribble, Jr., President, Christopher Newport University
- Senator William Wampler, Bristol
- Charlie Whitaker, Senior VP of Human Resources and Compliance, Altria Client Services, Inc
- John O. “Dubby” Wynne, Vice Chairman of the Council on Virginia’s Future

Ex Officio Members

Bill Bolling, Lieutenant Governor

Jim Cheng, Secretary of Commerce and Trade

Bob Sledd, Senior Economic Advisor

Commission Staff

Laura Fornash, Deputy Secretary of Education

Melissa Luchau, Deputy Director of Policy

Emily Webb, Special Assistant to the Secretary of Education

Committee Staff

Degree Attainment, Financial Aid and Workforce Training Committee-Beverly Covington, Policy Analyst and Dr. Joseph DeFilippo, Academic Affairs and Planning Director, State Council of Higher Education for Virginia

Innovation and Cost Containment Committee-Dr. Alan Edwards, Policy Studies Director, State Council of Higher Education for Virginia

Regional Strategies/Partnerships for Research and Economic Development Committee-Peter Blake, Vice Chancellor for Workforce Development, Virginia Community College System and Nancy Vorona, Vice President, Research Investment, Center for Innovative Technology

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